Veterinary Medicine

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Des Moines the A. V. M. A. Convention City

Des Moines, host to the forthcoming A. V. M. A. meeting, is the capital of Iowa, has a population of 140,000, adequate hotel accommodations, and is easily accessible by rail or motor. Its greatest point of veterinary interest is the fact that it is near Ames, and the latter city can be reached from Des Moines in one hour on the suburban railway at small expense.

Iowa ranks first among all the states in the value of farm land, the value of live stock, the fame of its agricultural college, the size of its state veterinary association, and among the foremost in the standing of its state veterinary college. On the other hand, it is responsible for Senator Brookhart and a near neighbor of Volstead.

If the A. V. M. A. were going to Des Moines because of scenic interest, it would probably meet in Timbuctoo; but if those who attend are going to this meeting for what they may learn of scientific value, for the pleasures of social intercourse and acquaintance, and for a hospitable welcome, none will be disappointed in the smallest degree.

No other veterinary association can "put on" a better meeting than the Iowa veterinarians. It comes as natural for an Iowa veterinarian to be a good association man as for a Hoosier to be an author. The programs at Iowa state veterinary meetings are a wonder to visitors; the attendance at Iowa state meetings is the envy of the Illinois state association and the despair of others.

The Iowa veterinarians have girded themselves for the task of making the 1924 meeting of the A. V. M. A. a brilliant success, and they will. In addition to the program listed elsewhere, we feel safe in assuring our readers that J. I. Gibson, an Iowa expatriate, will sing "Where the Tall Corn Grows" and 100 verses of his "How Do You Do" song, and that G. H. Glover will tell some good stories.

The interest of the association in Ames referred to in the foregoing is, of course, due to its being the location of the Iowa State College, the Veterinary Department of which, together with its graduates, has exercised a profound influence on the course of veterinary medicine in America, and contributed very largely in making the history of the profession what it has been in this country.

The Veterinary Department of the State College of Agriculture of Iowa was established as such in 1879, although considerable veterinary work had been given for a number of years preceding that date as optional in the agricultural course.

The school has had three deans—Drs. M. Stalker, J. H. McNeil and the present dean, Dr. C. H. Stange. The first class comprised four students, and the 1924 class sixteen students—not a large growth for 45 years, but the school has always strived for quality and disregarded quantity in its policies. Its extraordinary success in this is evidenced by the emi-

H. PRESTON HOSKINS

Dr. Hoskins is the enterprising and efficient Secretary of the A. V. M. A. and Editor of the official journal of the association. At the 27th annual meeting of the A. V. M. A. (then the U. S. V. M. A.) held at Washington, D. C., September, 1891, G. C. Faville, of Baltimore, moved that the secretary, W. Horace Hoskins, sire of H. Preston, be given "a life secretaryship in the association and a permanent salary of $250.00 a year." The motion was out of order, but would undoubtedly have carried if it had been put to the convention. If H. Preston continues to serve as acceptably in the future as he has in the past two years, he may confidently look forward to an equally extended term with a somewhat greater monetary reward.

C. P. Fitch

M. C. Hall

H. E. Kingman

Geo. Hilton

T. H. Ferguson

Robt. Rives

nence in the profession attained by its graduates. For example, S. Stewart, long at the head of the Kansas City Veterinary College; M. H. Reynolds, for many years Chief of the Veterinary Division of the University of Minnesota; C. A. Cary, for a generation Dean of the Veterinary Department of the Alabama Polytechnic Institute; R. A. Craig, at the head of veterinary education in Purdue University; Geo. H. Glover, Dean of the School of Veterinary Medicine of the Colorado Agricultural College; and S. B. Nelson, for many years Dean of Veterinary Education in the state of Washington, were among the first dozen graduates of this school.

H. D. Bergman

J. A. McKinnon

In the first dozen graduates also are found W. B. Niles of hog cholera fame; E. E. Sayers, long a leader in veterinary practice in Iowa; and G. A. Johnson of the Quality Laboratories. Later graduates include Dean A. S. Shealey of the University of the Philippines; Dean R. R. Dykstra of the Kansas Agricutural College; the Iowa school's present dean, C. H. Stange; Lieut. Col. J. H. Gould, U. S. A., retired; and H. D. Bergman, H. E. Bemis and Chas. Murray, professors in the institution.

The Iowa school was the first in America to adopt the regular four-year course with a four-year high school entrance requirement, another evidence of its disregard for quantity of output in its struggle for quality.

A. V. M. A. PROGRAM AT DES MOINES

The Committee on Local Arrangements had a meeting in Des Moines on Wednesday, June 4th, and made arrangements which are practically final for handling the association events, both regular and social. The following program was outlined:

Literary and Business Sessions

Tuesday, August 19

Morning—Opening session. Music by Chamber of Commerce Quartet.
Address of Welcome—Governor N. E. Kendall.
Response—Dr. J. G. Ferneyhough.
President's Address—Dr. C. H. Stange.
Afternoon—Business Session. No special events scheduled.
Evening—Meeting of Alumni Associations.
Sub-committee, H. D. Bergman, Chairman; R. D. Wall, H. J. Shore, J. H. Gould, in charge of hotels and meeting places, will have information concerning places which will be available and suitable from which the various associations may select their meeting places.

Wednesday, August 20

Morning—Section meetings. Rooms for each of the three sections will be available at Hotel Fort Des Moines.
Afternoon—Business session.
Evening—Banquet, president's reception and dance.

Thursday, August 21

Morning—Session for reading of general papers.
Afternoon—Business session.
Evening—Section meetings.

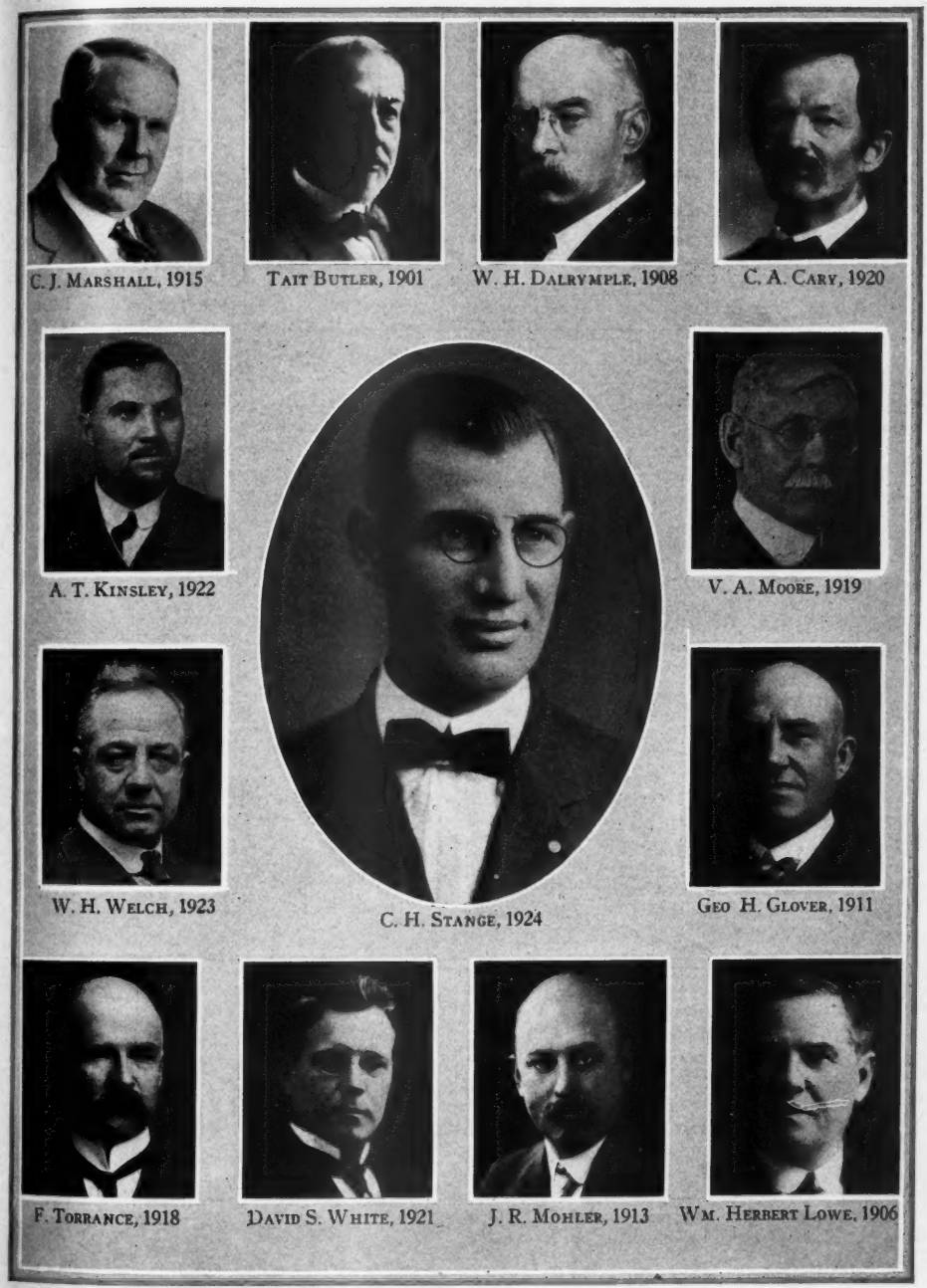
R. R. Dykstra

B. F. Kaupp

D. F. Luckey

J. C. Flynn

E. L. Quitman

R. J. Foster

PRESIDENTS OF THE A. V. M. A.

W. J. R. Fowler

J. H. Villeneuve

J. A. Campbell

A. J. Malmas

C. Head

E. A. Watson

Friday, August 22

8:00 a. m.—Special interurban train leaves Des Moines for Ames, arriving at Ames at 9:30. The entire club will be assembled immediately upon arrival at the college abattoir where there will be a short address of welcome by President Pearson, followed by the clinical program.

Each demonstrator will be given ten to twenty minutes to outline his demonstration before the entire assemblage, after which each demonstration will be placed in a booth in the Veterinary Building where later the details of each can be seen by all, as the assemblage will be dismissed

Duncan McEachran

F. T. Daubigny

A. A. Etienne

and scheduled past the booths. In this way there can be presented a large amount of very timely material and still no demonstrator displaced from the program. A large variety of conditions in a number of species will be shown.

4:30 p. m.—Automobile ride about the campus.

5:00 p. m.—Return trip to Des Moines.

Saturday, August 23

Race program and live stock exhibit at the Iowa State Fair grounds.

Social Events

Tuesday

Morning—Ladies and gentlemen attend the opening session.

Afternoon, 3:00 to 5:00—Ladies' Get-Acquainted Tea, South Ball Room, Fort Des Moines Hotel.

Evening—Ladies' Theater Party at the Des Moines Theater (one of the finest moving pictures in the Middle West).

Wednesday

12:30 p. m.—Ladies' Luncheon and Card Party at the Wakonda Country Club. This is one of the finest country clubs in the Middle West. It is located among the trees and aside from all of the facilities of a fine club house, it has a fine out-door swimming pool, small lake, polo grounds and stables, golf links, etc. This is going to be one of the finest social events the ladies have had provided for them at any of our meetings.

Evening—Banquet, 6:30, Fort Des Moines Hotel.

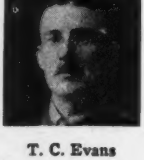
Music under direction of Professor Tolbert McTae. The speaking program has not been definitely arranged, but it will be short. Dr. Way has been asked to serve as toastmaster and Mrs. J. H. McNeil to respond for the ladies. There will be a few words from the retiring President and the new President and finally a short address by some leading veterinarian or agriculturist.

Following the banquet the reception will be held in the south ball room, while the main ball room is being cleared for the dance.

Thursday

Morning, 10:30—Trip for the ladies to Hoyt Sherman Place, the Women's Club building, where there will be a short musical program and one or two short talks by some members of the club on women's club activities. This is a delightful building and it should be a real opportunity for the ladies to get ideas for their own communities.

E. H. Cook


T. C. Evans

M. P. McClellan

J. R. Fisher

J. A. Allen

Afternoon, 2:00—Women's Auxiliary, South Ball Room, Hotel Fort Des Moines.

4:00 p. m.—Automobile ride for the ladies about the city and parks of Des Moines, which will include stops at points of interest, such as the State Capitol, State Historical Building, the home of the Armand Toilet Articles, and finally stopping for tea at the home of Lieutenant Colonel and Mrs. J. H. Gould.

Friday

8:00 a. m.—Trip to Ames. Upon arrival the ladies will be shown the dormitories for girls and the Home Economics Division in particular, as well as the college as a whole.

At noon a luncheon will be served on the campus which will be followed by a program of songs and campus dances.

H. E. Bemis
Chairman, Local Committee

THE A. V. M. A. MEETING IN DES MOINES IN 1895

The accounts of the meeting of the A. V. M. A. (then the U. S. V. M. A.), held in Des Moines 29 years ago, as published in contemporary veterinary journals, is of much interest at this time.

Dr. W. Horace Hoskins, of Philadelphia, was president and was re-elected for a third consecutive term. Dr. S. Stewart, of Kansas City, was secretary, just beginning his six consecutive terms in that office.

Eastern members enroute to the meeting stopped over a day in Chicago and inspected the McKillip Veterinary College, described as the "new" college.

According to the American Veterinary Review, the second day of the meeting was devoted to a discussion of tuberculosis. According to the editor, "The freshness and brightness with which this subject was discussed has deeply impressed the Western veterinarians and several of them expressed to the writer their appreciation of the high degree of intelligence displayed by some Eastern speakers."

The papers presented at this meeting were as follows: The Horse as a Producer of Antitoxins, by Olof Schwarzkopf; Accidents Incident to Casting and Confining Animals for Surgical Operations, by Tait Butler; Roaring and Its Operative Treatment, by S. J. J. Harger; An Improved Method of Plantar Neurotomy, by M. H. McKillip; The Therapeutics of Colic, by W. L. Williams; Hypodermic Cathartics, by M. H. Reynolds; and Anesthetics in Horses, by J. C. Meyer, Jr. One can but wonder if those who will contribute to the A. V. M. A. program this month will be equally well known thirty years from now.

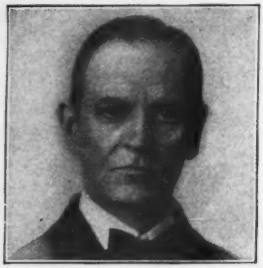
To quote again from the Review: "The meeting was followed in the evening by a banquet at Evan's Cafe, at which a good menu was provided. At first it looked as if the members were doomed to drink Iowa water, but finally the barriers of law were broken and wine and beer flowed freely, producing that feeling of cheerfulness, without which a banquet must remain a dead formality."

E. R. STEELE

Dr. Steele apparently is making a collection of secretaryships, being at present secretary of the Missouri Valley Veterinary Association; The Iowa Veterinary Association; and of the Practice Section of the A. V. M. A. All important positions and all capably filled.

Between whiles, Dr. Steele attends to a thriving practice at Grundy Center, Iowa. The practitioner that handles the work of the secretary of one good, big, live association, usually thinks he is swamped with office work; but with three such jobs, Dr. Steele manages to avoid the loss of flesh from worry. Not so long ago, Dr. Steele was accumulating a collection of diplomas and certificates of attendance and very shortly managed to acquire them from the University of Kansas, the Kansas City Veterinary College, the New York State Veterinary College at Cornell University, and the Edinburgh Veterinary College. He doesn't do things by halves.

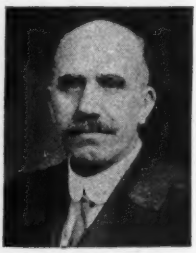
The attendance at the banquet was thirty, including three visitors, secretary to Governor Richards, Congressman Hull and Harold Sorby. The law above referred to was one



P. A. Fish

prohibiting the sale of liquor after 10 p. m. It was evaded by laying in sufficient stock before closing to last all night. Tradition has it that this was the last wet banquet of the A. V. M. A. But then tradition overlooks a good many things, as for example the Oakland banquet in 1915. S. Stewart is said to have been responsible for the dry beginning at the Des Moines banquet and to have succeeded in making them all dry during the remainder of his six years as secretary, by which time abstemious habit was firmly established.

The second annual meeting of the Association of Veterinary Faculties of North America was held during the meeting of the national association. In attendance were Prof. Chas. P. Lyman, president; Prof. Olof Schwarzkopf, chairman of the executive committee; Prof. Osgood of Harvard; Profs. Pearson and Harger of the U. P.; Prof. Gill of New York College of Veterinary Surgeons; Prof. Salmon of the National Veterinary College; Profs. Wattles and Stewart of the Kansas City Veterinary College; and Profs. Stalker and Niles of the Veterinary Department of the Iowa State College. That only one, the last of those named, is alive to participate in the next Des Moines meeting, is a striking testimony to the toll of time. Will another thirty years see an equal depletion of the leaders of today in veterinary education? The loss to the Grim Reaper in the short period of thirty years is further evidenced by the fact that the president, secretary, treasurer, all the vice presidents and both the editors who reported the Des Moines meeting have all passed to the Great Beyond.



C. D. McGilvray

J. L. Tyler

The Des Moines meeting of the U. S. V. M. A., held in 1895, was the largest in point of attendance of any meeting of the association up until that time. It was the first held west of the Father of Waters. It answered in the affirmative whether successful meetings of that association could be held in what the veterinary journals of that day termed the "West."

No report of the meeting was published by the association because of lack of funds.

The Iowa State Veterinary Association met at the same time as the national association and at the same hotel. At the Iowa meeting, to which the members of the national association were invited for one session, Prof. W. L. Williams, then veterinarian to the Montana Agricultural Experiment Station, read a paper on immobility in the treatment of diseases of the extremities. About twenty years later, Prof. Williams' recommendations came to be generally followed by the medical profession, and they are now being adopted by the veterinary profession.

In neither of the journals in which accounts of the 1895 A. V. M. A. meeting were published is the number in attendance stated, although both acclaim it as having been an unusually successful meeting and the attendance as having been larger than at any previous meeting. An "eye-witness" is positive the attendance did not exceed 25. The Journal of Comparative Medicine and Veterinary Archives states that the attendance at the Iowa state meeting was "about thirty or forty." Iowa veterinarians confidently expect an attendance at the next Des Moines meeting twenty-nine times as great as that at the Des Moines meeting 29 years ago.

PROMINENT VETERINARIANS ENGAGED IN COMMERCIAL LINES

The importance of the veterinary supply house has increased enormously in the scheme of the average practitioner during the past twenty years. Many refinements in vegetable drugs, many new chemicals and a largely extended line of biologic products have been presented to the profession during that time and these things perhaps even more than better methods of diagnosis and a more comprehensive knowledge of the cause of disease are responsible for the better success with which disease is combated by the present day veterinarian as compared with his predecessor of only a score of years ago.

Even the best veterinarians stood helpless before hog cholera or tick fever at the beginning of this century. Fowl cholera and hemorrhagic septicemia and glanders presented as

PROMINENT VETERINARIANS IN COMMERCIAL LINES

great difficulties of control in those days as contagious abortion does at this time; while it is only within the past five years that the spread of tuberculosis in cattle has been checked. Other examples might be cited of the greater success in veterinary practice that has come from a better understanding of the diseases with which we have to contend; better diagnostic, better therapeutic, better sanitary and better control methods.

Not all or many of these measures can be worked out by the practitioner. The general practitioner has not the clinical facilities, the training, nor the experience to assume the role of the experimentalist. For this he must depend upon the research of experts and this is why many of the ablest minds of the profession have been called to research work in the Federal Department of Agriculture and the State Agricultural Experiment Stations and engaged in similar work for commercial firms that supply the ammunition with which the practitioner essays his tasks.

The practitioner must exercise keen judgment, however, in the matter of the selection of his armentaria and differentiate between the glowing enthusiasm of the salesman and the thoughtful conclusions of the scientific expert. The research worker in state or Federal employ has himself to sell and the veterinarian with the commercial firm has its products to sell. In the long run the success of both depends upon the accuracy of their findings or the value of their recommendations. Individuals of both classes have been carried into error by their enthusiasm. The practitioner must not abdicate his right to the final say as to what method he will use or what materials he will employ.

Some brief biographic notes concerning those whose likenesses are here shown may be found on page 24.

There have been some reports of serum sickness in swine as a result of injection of anti-hog-cholera serum made from garbage fed hogs. It has been suggested that the blood from garbage hogs has an excess of acid. This hyperacidity can apparently be overcome by the intravenous injection of sodium bicarbonate into the garbage fed hyperimmune; at least sickness did not occur in swine that were treated with anti-hog-cholera serum obtained from garbage fed hogs that had been injected with sodium bicarbonate.

PUBLIC HEALTH

The following, abstracted from "The Nation's Health" of February, 1923, should be of interest to all veterinarians:

"Not only is the trained veterinarian assisting in the solution of many problems of human pathology through research into the disease of animals," says the writer, "but he may also be of incalculable value in preventing the spread of communicable diseases of animals to man. By collaboration and an interchange of thought, the medical and veterinary professions will receive much mutual benefit, while for the health worker the veterinarian will prove an ally of the greatest worth. As a matter of fact, the eradication of several diseases common to man and animals rests, in the final analysis, with the veterinary scientist.

"Glanders, through the discovery and application of mallein, has become extinct in Great Britain; human rabies will disappear if the veterinarian will control his canine patients, while he may render great aid in the eradication of anthrax, foot-and-mouth disease, and cow-pox. It has been stated that each year more than ten thousand British children die from drinking the milk of tuberculous cattle, of which it is estimated there are a million in England and Wales. The control of mange, ring-worms, actinomycosis, echinococcosis, trichinosis, the beef and pork tapeworms, also fall within the purview of both animal and human public health, since they are intertransmissible, and there is also a broad common ground in the prophylaxis of the virus diseases in which there should be the fullest co-operation between veterinarians and sanitarians.

"The time has come when the health worker who does not avail himself to the fullest extent of the assistance of his veterinary colleague is neglecting an opportunity of great potentialities, not only because of the intercommunicability of many animal and human diseases, but also because, by the study of the analogies between the pathological processes of man and those of the lower orders, much knowledge may be gained which can be employed in the protection of the human species.

"Public health is not a science standing in isolated grandeur. Rather is it a co-operating and co-ordinating focus at which meet all of those sciences which may assist in surrounding man with every safeguard which will protect and prolong his life."

—Veterinary Record

The Present Status of Abortion Disease in Cattle, Its Spread, Influence of Male and Control*

By W. E. Cotton, Experiment Station of the U. S. Bureau of Animal Industry, Bethesda, Md.

The subject that I shall try to present to you is that of the abortion disease of cattle that has for its cause the abortion bacillus of Bang. This disease is probably responsible for upwards of 90 per cent of abortions in cattle and causes losses to the cattle industry very close to or even exceeding those caused by tuberculosis. It is present to a greater or less extent in nearly every section of the country where cattle in any considerable numbers are kept. It is the bane of the dairy industry and is also a source of great anxiety to the breeder of beef cattle. It has caused great losses in pure bred herds and strikes at the very root of our cattle industry. Its rapid spread has been due in a large measure to the unsuspected carriers of which there are so many.

Unlike tuberculosis, which is strictly a progressive disease and which once introduced into the herd tends to spread till all its members are infected, there being practically no recoveries, abortion disease, from the herd standpoint, tends to run a course and gradually die out. This is true if no animals are introduced from the outside. The number of abortions reach a maximum; then become less and less each year as the herd gradually acquires immunity, some animals through aborting and others probably by repeatedly imbibing small quantities of infection, while they are relatively insusceptible, from the infected members of the herd. The calves and younger animals exposed from birth acquire resistance in the same way, and when bred, have sufficient immunity to resist moderate exposure. A herd of this kind would probably not be troubled very much with active abortion disease so long as the younger animals continued to receive their immunizing doses from the infected ones. Animals that had not received this natural immunization, if introduced into the herd, would be apt to become infected, abort, and set up an active form of the disease which might, through increased virulence or massive infection, break down the immunity which is probably not very great, possessed by the other members of the herd, and thus start another outbreak of disease. A closed herd, that is, one to which no outside animal is added, which has acquired immunity in the above manner would probably become susceptible shortly after the disappearance of the carrier animals supplying the small immunizing doses of infection.

The disease is a peculiar one in that it is not a disease of either the cow or the fetus, but of structures that lie between the two and through which the latter is nourished, viz., the fetal membranes. The fetus suffers because its supply of nourishment and of oxygen is interfered with, and not because of active disease in it. The tissue in which abortion germs can rapidly multiply is to be found in the cow's body only while she is pregnant. True, the germs can maintain themselves in such a permanent structure as the udder, but no apparent disease is produced in it and multiplication of the organism there is slow. The two organs, the pregnant uterus and the udder, seem to be the only places in which the abortion bacillus can maintain itself for any considerable time.

The disease induced in the fetal membranes does not necessarily lead to the death of the fetus. Infection may occur so late in pregnancy, or the disease progress so slowly, or even be overcome, so that the nourishment of the fetus would not be interfered with to a degree to greatly injure it. In any one of these cases a living, more or less vigorous calf would no doubt be produced, but unless the infection had been entirely overcome, the fetal membranes would prove to be infected. These are the cows that react to the blood tests and may have infected udders but do not abort. They help to make the long list of unsuspected carriers.

The Etiological Factor

The causative agent of the disease, the Bacillus abortus, is well known and we need to discuss it but briefly. It is a rather unusual organism, in that it requires for its maximum growth an atmosphere of reduced oxygen content. It is strictly neither an aerobe nor an anaerobe. It grows luxuriantly on culture media in an atmosphere containing 10 to 25

* Presented at Kansas State Veterinary meeting, Manhattan.

per cent carbon dioxid gas. It does not form spores, and does not multiply in nature, outside of the animal body. It is killed by pasteurization and the ordinary disinfectants. It will, however, remain alive in fetal and placental tissue exposed to the weather four months or longer during the colder months and for a very much shorter time during warm weather.

Animals That Are Susceptible

In addition to causing abortion in cattle, the abortion bacillus produces definite lesions in guinea pigs when introduced into them either by ingestion or inoculation. Several other species of animals can be infected experimentally but do not seem to be susceptible to natural methods of infection excepting possibly in rare instances and hence are not believed to be factors in the perpetuation of the disease. There are two exceptions to this, however, and further investigations may discover others. These are the rabbit and the hog. Rabbits can by inoculation be made to harbor abortion bacilli in their livers for considerable periods without visible lesions being produced, and it has been asserted that they can be caused to abort by ingesting abortion bacilli, but it seems doubtful whether in nature wild rabbits, because of their cleanly food habits, would ever ingest enough bacilli to become infected. Hogs are susceptible to abortion infection and the disease has become of considerable importance in several states, but the type of the bacillus that attacks them is not quite like that commonly found in cattle and whether the hog type attacks cattle has not been conclusively proved. It produces practically the same effect in hogs as the bovine bacillus does in cattle, but it can be distinguished from the latter by the character of lesions it produces in guinea pigs. The lesions differ markedly from those caused by the bovine type of the bacillus. Cows can be experimentally infected, caused to abort and their udders to become infected with the germ isolated from hogs, but up to the present, though we have tried repeatedly, Dr. Schroeder and I have not succeeded by natural methods of exposure in infecting cattle with the germ isolated from hogs or hogs with that isolated from cattle. Whether there are two distinct types of the abortion bacillus, bovine and porcine, as there are three distinct types of the tubercle bacillus, human, bovine and avian, or whether they are only modifications of the same type, has not yet been determined, but experiments are in progress to that end. Until we have gained more knowledge on this point it will be advisable to act as though cattle can be infected from hogs and vice versa.

The whole question of possible carriers other than cattle deserves further study. Early investigations indicated that other animals were probably not factors in spreading the disease, but additional investigations to determine this definitely in the light of additional knowledge and improved methods, seem desirable.

Proved and Theoretical Modes of Infection

The most important mode of infection, and in fact, the only one that has really been proved to occur naturally, is by ingestion. The animal swallows the abortion bacilli in either food or water. Infection has been brought about repeatedly by a number of investigators in this manner both by the use of pure cultures of abortion bacilli and tissues infected with them, and it is now generally believed that this is at lease the usual mode of infection. At one time Dr. Schroeder and I were of the opinion that infection might occur through the milk ducts. We had succeeded in infecting the placenta of a cow by injecting abortion bacilli into her udder through the milk ducts, thus proving that the infection would reach the pregnant uterus from the udder. We then tried to determine whether through the act of milking, abortion bacilli on the hands of the milker would find their way into the milk ducts and the udder. In other words, whether a milker would, through milking cows having udders infected with abortion bacilli, carry this infection to healthy cows in a way that would infect their udders. Attempts to cause the abortion bacillus to pass through the milk ducts by manipulation of the teats and udder were unsuccessful. This and an experiment extending over a considerable period in which a man milked cows with infected udders before milking those without, with negative results, coupled with other observations convinces us that natural infection through the udder is of little if any significance in the spread of the disease.

Infection through the genital tract at the time of copulation and later, was once thought to be the usual way, probably because it was the most direct, but with this as it is with highways, the most direct line is not always the easiest nor best to follow. A more circuitous route which goes around obstacles and by winding gentle grades overcomes the hills, usually proves to be the one that will be followed. Concerning the highways of infection, evolution has no doubt seen to it that the main entrance and exit to the generative chamber is carefully guarded, and an invader such as the abortion bacillus which

strikes at the very life of the species, would find obstacles in its way difficult to overcome. But there is another way—a sort of common route to all parts of the body and which for this organism does not seem to be specially guarded —this is the vascular system through which the blood stream brings nourishment to the fetus and its membranes—a roundabout way, but one comparatively easy to follow. Abortion bacilli entering the blood stream from the digestive tract will certainly be brought into intimate contact with the fetal membranes unless they are filtered out by the lungs or liver before they enter the arterial circulation. That all of them are not filtered out is proved by what follows the feeding of abortion infected material to pregnant cows. Artificial infection via the generative tract is no doubt possible if massive amounts of infection are introduced, but in these cases it is difficult to exclude possible infection via ingestion. Dr. Schroeder and I tried to infect cows by introducing abortion bacilli in both cultures and tissue into the cervix of the uterus immediately before service but failed to do so. The cows conceived, failed to react to the blood test and produced normal calves. We also allowed infected bulls to serve cows but they did not become infected. This experiment extended over several years and a number of animals were used in it. Two of the bulls were proved to be disseminating abortion bacilli with their seminal fluid. Other investigators have obtained similar results.

Times of Least and Greatest Susceptibility

(a) Calves, certainly up to the three months and possibly up to six months or more, are immune. Those from infected dams often react to the blood tests for a time, but the reactions are not due to actual infection and soon disappear even though the animals continue to take infected milk from their dams.

(b) Virgin heifers, though probably fairly resistant, are occasionally found to be infected. We have had two such animals at the experiment station and Dr. Theobald Smith reports two such cases, the udders of both of which he found to be infected. It is possible that the practice of feeding young animals milk up to the time they approach sexual maturity, as obtains in many pure bred herds, is responsible for the infection of virgin heifers.

(c) Non-pregnant cows, though not highly susceptible, do sometimes become infected if the exposure is severe.

(d) Pregnant cows are the most susceptible. The tissue on which the abortion bacillus thrives best, and which can be damaged to the injury of the fetus which depends on it, is present in the bodies of such animals. Abortion bacilli entering the blood stream would at once find a favorable soil in which to multiply and start on their work of cutting off the supplies necessary to the proper development of the fetus. Whether there is one period more than another during gestation of greater susceptibility, is not definitely known, but it would seem that after the placenta had been formed there may be no great difference, but, as the termination of gestation approached, the chances for infection just introduced to cause an actual abortion would decrease because of lack of time for it to produce sufficient lesions to interfere seriously with the nourishment of the fetus. It is likely that many of the infected cows that do not abort are ones that have been infected late in pregnancy.

Since pregnancy is the time of greatest susceptibility, it follows that that is the time when cows should be protected most, and if they can not be protected all the time, our efforts should be concentrated on protecting them during this period.

The Detection of Infected Animals

Something can be done in the way of detecting the disease by observation. Cows retaining their afterbirth should be regarded with suspicion, though this is by no means a certain sign of abortion infection. Often, but not always, the placenta and fetal membranes present characteristic lesions, thickened indurated membranes and necrotic cotyledons of a yellowish gray color. Unfortunately the abortion infected cow can not be detected by ordinary observation before she aborts or produces a calf. The serological tests and sometimes other biological tests are necessary for this.

Since the serological tests are to be discussed by another speaker, I will refer to them but briefly. Both tests, the complement fixation and the agglutination, are widely recognized to be equally reliable, but the latter, because of its simplicity, seems to be the favorite with most investigators; hence, I shall confine myself to it. It is as reliable as any biological test, but like all of them, has its limitations. We are sometimes tempted to forget these, and to expect too much of it. A reaction does not necessarily mean present infection, but it does indicate either this or past infection. Which it is can usually be determined with a fair degree of accuracy by several successive tests made at short intervals, and by the height of the reaction. The test will not tell us whether the reacting animal is going to abort, neither will

any test that I know of predict the outcome of any disease with precision unless it is a disease that is always fatal, or one that never is. We must remember that abortion is the fatal termination of abortion disease, and that this disease, like most infectious diseases, is not always fatal.

Guinea pig inoculation of fetal membranes and discharges, and of milk have their uses in determining infection, but the time and expense required for tests of this kind limit their use to investigators. They could not be generally used.

The Dissemination of Infection

The greatest disseminator of abortion infection is the aborting cow at the time of abortion and for a short period following it. The membranes, fetus, and discharges all contain innumerable abortion bacilli. Leakage from the uterus shortly preceding the abortion would also likely be found to be infected. It has been assumed that discharge of abortion bacilli from the uterus prior to abortion, excepting during a few days preceding it, does not occur. While I am inclined to believe that this is true, yet we have no satisfactory proof that it is. It is a question that deserves further study, for it makes quite a difference in the use of control measures whether the infected cow is a menace throughout her pregnancy or at and about the time of abortion only.

After an abortion, if the afterbirth is not retained and there are no complications, the abortion bacilli soon disappear from the genital tract; even when the afterbirth is retained we have not found them to be present beyond fifty-three days, and usually not beyond two weeks.

Next to the aborting cow, the infected cow at the time of a premature birth or even at full term, is important as a disseminator of infection. While the number of bacilli passed from the uterus may not be so great as at the time of an actual abortion, yet it is enough to infect other animals.

This brings up the question of carriers—one of the most important connected with abortion disease. Carriers play a very great part in the perpetuation of most infectious diseases, but the proportion of carriers to the number of cases of disease is usually not great. However, with abortion disease it is very great, and some cows remain carriers for years and even for the balance of their lives. They become carriers because their udders become infected. The abortion bacilli can maintain themselves there and while they do not cause determinable disease in this organ, they are disseminated through the milk and are also ready, when the animal becomes pregnant, to be transported through the lymph and blood streams to the uterus where they may set up sufficient disease to cause an abortion or premature birth; or the disease may not be sufficient to cause either of these, yet the expelled placenta and discharges may contain living abortion bacilli fully capable of infecting any susceptible cow they happen to reach. Not all carrier cows by any means, eliminate abortion bacilli at the time of parturition, but perhaps fully 50 per cent do at some time, and there is always great danger that any one will. The carrier that does not abort, is particularly dangerous because she is unsuspected, and to her, were all the facts known, could be traced the origin of many mysterious outbreaks of disease. The abortion disease carrier is a subject that the veterinarian should keep foremost in his mind.

Milk from infected udders in itself is probably not a great menace, because the abortion bacilli in it are rarely very plentiful and cows ordinarily do not consume milk. Under usual conditions it would be only the small amount that might be spilled on feed that would reach them.

Milk fed to young animals approaching maturity may possibly, as already stated, infect them. Since there may be other animals than cattle that may act as carriers of infection, it will be well to avoid taking liberties with infected milk, and all milk returned from public creameries should be pasteurized or sterilized before it reaches the farm.

The Bull as a Disseminator of Infection

It was at one time believed that the bull was a very important factor in the spread of the disease, either directly, because of infection within his genital organs, or by acting as a mechanical agent to carry the infection from the diseased genital tract of one cow to the healthy one of another. It was quite natural to believe this because in this way it seemed possible to place the infecting agent very near to the site of the future disease. As has already been explained, our ideas of the importance of this mode of infection have changed, and the experimental evidence virtually proves that the bull does not infect in this manner. He is, however, sometimes a disseminator of infection but in a different way. Not a very large proportion of bulls become infected. The disease may manifest itself by lesions in the epididymes or in the seminal vesicles. The abortion bacillus can also be isolated from lymph glands through which these organs are drained. Disease of the

epididymes and seminal vesicles would almost certainly insure infected seminal fluid, and while we believe this would not infect directly by being introduced into a cow's genital canal, it would be very apt to cause trouble by the leakage from the cow and from the bull soiling feed or water to be consumed by susceptible cows. It can readily be seen how easily such a bull turned loose with a herd of cows might infect the herd by leakage from his penis, even if he does not serve a single cow. It is best not to use an infected bull, and community owned or promiscuously used bulls should serve cows only on neutral ground or ground to which cattle do not have access except at time of service, and the cows should be so handled after service as not to be a source of danger to other cattle and themselves through leakage of the possibly infected seminal fluid from their vaginas. This can be accomplished by keeping them tied up in isolation till leakage from the vagina has ceased.

As to the danger of a bull, though not infected himself, mechanically carrying infection from cow to cow through copulation, it should be borne in mind that the abortion bacillus does not remain long in the genital tract of a cow after an abortion, and that after two or three weeks there would be little danger of any being there, and after two months almost none. If no cow is bred earlier than two months after an abortion or parturition, the danger would be practically eliminated. No cow should be served if anything is abnormal about her reproductive organs.

Allowing a bull to serve a cow that has very recently aborted or one that has very recently produced a calf and passed an infected afterbirth, would be an unwise thing to do because there would be the danger of spreading infection as with the infected bull but of course in a lesser degree, and besides, though bulls seem difficult to infect, yet some of them do become infected. Allowing a bull to serve a cow that has very recently aborted, when one takes into account the habits of bulls, is quite a severe form of exposure of the bull through ingestion.

Acting on the assumption that the bull transmitted abortion disease through copulation, douching of his sexual organs with solutions of disinfectants has been recommended in the past. It can readily be seen that if the bull is actually infected, abortion bacilli, if disseminated, would be contained in the seminal fluid beyond reach of the disinfectant and douching would therefore be futile. Douching of the bull's genital organs before and after service may be of value to prevent the transmission of other diseases concerned with the generative organs, but it has no place in the control of abortion disease.

Control

Legislation: Regulations restricting the use of living abortion vaccine to herds proved to be infected, and preventing the misrepresentation of the status of an animal relative to abortion disease would be highly desirable; but the time is not ripe for drastic, complicated and troublesome regulatory measures for the control of abortion disease.

Sanitary Measures

Protecting the non-infected herd: The owner should be advised to restrict his purchases to immature animals as much as possible and require all animals entering the herd to pass two blood tests, the second of which should be made at least thirty days after removal from possible exposure. This, so far as we know, will quite effectually prevent the introduction of infected animals. The food and water supply should be carefully watched. All milk from public creameries should be pasteurized or sterilized before it is brought to the farm. If a neighbor has abortion disease on his premises efforts should be made to get him to dispose of products of abortions and placentas from all parturitions, and not let them lie about to be carried to clean herds by dogs and other agents. Infection will not come to the herd unless carried in some way and if we can reduce the amount available, we will be that much more likely to succeed in keeping our herd clean. If an abortion should occur, isolate the animal, disinfect everything that has become soiled with the products of the abortion and have her blood tested after two weeks. If she reacts it will be necessary to test the entire herd to determine whether the infection has spread.

Infected Herds

If the herd is infected, the extent to which the infection has spread should be determined by one of the blood tests. This information, coupled with the history of the herd relative to frequency of abortions, will make it possible to decide whether it will be better to try to eradicate the disease at once or to try to bring about herd immunity and reduce losses as much as possible while this is being established.

If the infection has been recently introduced and only a few animals have become infected, it will be advisable to endeavor to eradicate the disease by separating the reacting animals from the others, and by using the usual sanitary measures. In determining which animals are

infected and which are not, it will be best to consider those reacting to the agglutination test in dilutions of 1 to 200 or more as infected, and those in dilutions of 1 to 100 or less as doubtful. The latter may either be so recently infected that their reactions have not reached their maxima, or they may be animals in which the infection has died out. Subsequent tests will be required to determine this, and the animals should be kept in isolation till these can be made. The high reactors can either be disposed of to enter infected herds or for immediate slaughter, or they may be kept segregated at considerable distance from the balance of the animals. The last named disposition would, perhaps, be best until it can be determined whether the eradication plan is likely to succeed. It should be borne in mind that these highly reacting animals are not necessarily diseased animals in the strictest sense of the word. Many of them will never abort and will produce calves regularly and are valuable animals to have in an infected herd if properly handled, because they do possess considerable immunity. They are, however, unsafe animals to mingle with susceptible ones because most of them are carriers of the abortion bacillus.

Tests of the clean portion of the herd should be made at intervals of two months until no new reactors are found, after which two tests should be made at six months interval.

Maternity stalls should be provided for both the clean and infected portions of the herd. For the former to prevent possible dissemination from an infected animal that for some reason failed to react until after abortion or parturition, as occasionally happens, and for the latter to limit as much as possible the amount of infection disseminated. No animals should be added to the herd until the disease is well in hand.

If the same bull is used to serve both clean and infected cows, the precautions already mentioned under discussion of the bull should be taken.

The above method of eradication has been tried with success in a small number of herds and should prove successful in those in which the disease is discovered before many animals have become infected, provided the source of the first infection is cut off and the various channels of fresh infection from without are properly closed.

Herds having a history of a considerable number of abortions and which on testing show a large percentage of reactors, should be treated in a different manner because too many animals would have to be segregated to make the plan practicable. A herd of this kind is best treated as a patient suffering from one of the self limited infectious diseases. A disease of this kind, once it has become established, must run its course and the best we can do is to help nature to bring the affection to a speedy and favorable termination with a minimum amount of suffering and loss of vitality to the patient. Our efforts with the herd should be directed toward bringing about immunity with a minimum amount of loss. To this end, the reacting animals should be retained, but we should, through the use of maternity stalls and the collection and destruction of infected material and by keeping the pregnant infected animals separated as much as possible from the pregnant non-infected ones, reduce the amount of exposure given the latter. It should be kept in mind that small doses of infection taken while not pregnant may tend to immunize, but doses, especially massive ones, if imbibed while the animals are pregnant, will probably break down the immunity they have acquired. I believe that abortion vaccine, provided it consists of a suspension of living abortion bacilli, could be used in such a herd to advantage, but before using it the owner should be advised that it is not a perfected product and that its use still partakes somewhat of an experiment, that for some unknown reason it sometimes suddenly loses its potency and that too much should not be expected from it. It will not help him to get rid of the disease, but if it is actually living it does seem to be of considerable value in preventing abortions and will thus help to tide over a crisis. It should never be used unless the herd is proved to be infected with B. abortus, and should then be used on non-pregnant animals only, two months before they are bred.

The herd should be kept free from its offspring if possible. If it should become necessary to introduce new cows or heifers they should either be reactors or treated with vaccine or at least kept for a considerable time in the infected environment before they are bred.

After the disease has run its course, it may be found that the herd does not contain many high reactors. If this is the case, and it is desired to make a clean herd of it, the few reactors could be taken out, the premises thoroughly cleaned and disinfected, and after several tests had been made of the remaining animals to make certain that all infection had been removed, the herd could be considered a non-infected one.

Building a Clean Herd from an Infected One

The owner of an infected herd may desire to build up a young, clean herd for the old one. This can be done provided he has facilities for protecting the young herd from becoming infected. Calves may be kept with their infected dams until weaning time practically without danger that they will become infected. They should then be removed and placed in quarantine for a week to allow any abortion bacilli that may be present in their intestines to pass out, after which they can be moved to the new herd. The new herd should be tested periodically to make sure that no infection has spread to it, and the periodic tests should continue until all possible sources of infection have been eliminated.

The Use of Medicinal Agents, Bacterins and Vaccines

Many medicinal agents have been recommended for internal use, and cattle owners have been led to believe that they are beneficial, but when these agents have been put to a real test they have invariably proved to be worthless either in preventing or curing abortion disease. The fact that abortion disease runs a course in a herd makes it possible to obtain apparently good results from almost any treatment, because it is usually tried the year following an outbreak, the losses are much less than they were the year before and the remedy gets the credit for the reduction which would probably have been the same had no remedy been used.

Disinfectants have their use in destroying abortion bacilli that can be reached by them, but the indiscriminate douching of cows with strong germicidal agents should be discouraged.

Bacterins, suspensions of killed abortion bacilli, have not in the past been found to be of value. Recently, however, the work of some investigators seems to indicate that there is hope that a bacterin may eventually be made that will be of value, but that now available has little to recommend it.

It is the function of the practicing veterinarians to protect the health of our animals, a most important function when the magnitude of the country's animal industry and its vital import to the people are taken into consideration. Without healthy animals this industry would be a crippled one which might be compared to a factory trying to run with broken down machinery. Great plagues tend to produce this condition and the constant vigilance of the veterinary profession is called on to overcome them. Much has been accomplished in combating several of these plagues and there is no reason to believe that we will be less fortunate in fighting abortion disease. We are sometimes tempted to be discouraged as our best efforts seem to be of little avail, but if we look back a few years we cannot help but realize that we are in a much better position to cope with the disease than we were then. A number of facts about the disease have been discovered of which the veterinarian can make use, and while there is much yet to be known he can go forward with the light he has, confidently feeling that his efforts are at least in the right direction, and seek for further knowledge that will help him more and more to become master of the disease.

In closing I want to impress on your minds the need for the careful consideration of the following subjects about abortion disease:

1. The value of the blood tests, properly used and interpreted, as aids to accurate diagnosis.
2. The danger from the carrier cow.
3. The avenues of infection and dissemination.
4. The time of greatest susceptibility.
5. The part played by the bull.
6. The development of herd immunity.
7. The proper estimate of the value of obtainable vaccine, its use and limitations.

Having a good knowledge of the known facts on these subjects you will have no great difficulty in working out most of the problems on abortion disease that will be put to you, in so far as they can be solved with our present knowledge.

Virulent B. tularense has been recovered from unfed adult Dermacentor andersoni collected in the spring of 1923. According to the history and origin of these ticks, it is apparent that the infection must have been acquired from an infected host by an antecedent stage sometime during 1922. The transmission of this organism from tick to tick makes more difficult the control of tularemia.

McGavock of Columbia, Mo., has written a splendid history of the breeders and animals that have made American Hereford history. This article was published in the June 1st issue of the American Hereford Journal. Those interested in Hereford cattle should obtain a copy of the journal above referred to as it is one of the most complete and authentic records on this topic in print.

Handy Veterinary Appliances

By S. D. Myers, Wilmington, Ohio

The writer has been prompted by an article in the June number of Veterinary Medicine on "Photography for the Veterinarian" to send in a few snapshots that may be of interest.

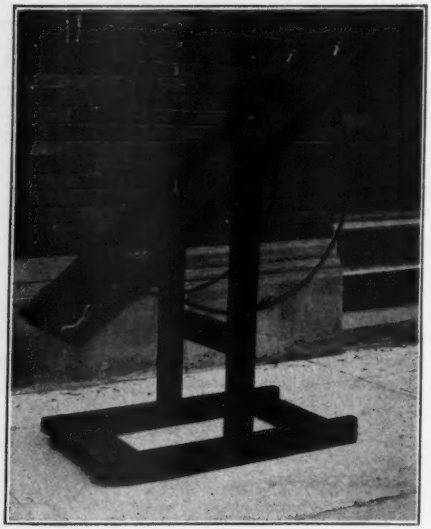


Fig. 1

No. 1 represents a small animal table designed and mostly constructed by the author. The top of the table is 5 feet long, 17¾ inches wide; height from floor to the top of the table, 37½ inches. The wire grating (part of an old delivery wagon door) is made of 5/32 inch wire.

The writer would prefer having the grating run the full length of the table, but in this case it was not long enough, so had to be pieced out with wood. The base is made of 2x4 hard pine, mortised together; thus far no braces have been needed. It will be noticed that the bottom of the sills are cut in the shape of sled runners at one end, and a section of board one inch thick to which two casters are screwed, is fastened between the runners; these casters do not come in contact with the floor except when the other end of the frame is raised.

Fig. 2

The V-shaped iron at the top of the table is made from one-inch buggy tire and is supported on three segments of pipe ⅞ of an inch long and has three large holes on either side to which the hopple snaps may be fastened. The half-circle irons are made from ½-inch round steel and secured to the perpendicular pieces on either side by hook-bolts and tail-taps.

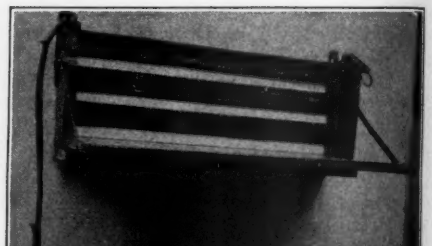


Fig. 3

The advantage of the grating is that an animal, large or small, may be secured in most any position by small ropes or tapes.

A drain pan may be easily fastened to the bed of the table if so desired.

No. 2 represents a combined work table and hog-cholera serum crate, closed.

No 3 represents the same crate with the front let down to form a work table. The inside dimensions of the crate are as follows: 21¼ inches long, 3½ inches wide and 8¼ inches deep. It will hold six 500 c.c. bottles. The small instrument at the upper left is a mechanical counter. The box is made of walnut.

One will find after using this box for a time he would not think of starting out without it. The writer carries a few slater's nails with

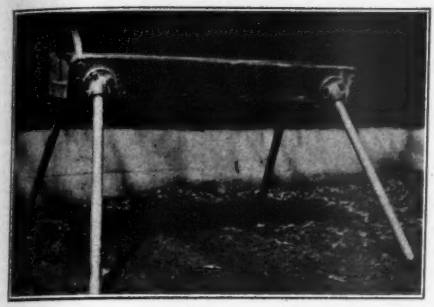


Fig. 4

which to fasten the box to a wall or fence and in about three-fourths of the places when he returns for another job, the nails are right there, ready for use.

No. 4 represents a trough for holding hogs for vaccination. The trough is made of ⅞ inch oak and is 42 inches long, 4½ inches deep and 10 inches between the tops of the flare-boards. The legs are one inch (inside) galvanized pipe; they may be unscrewed from the flanges and the trough secured to the running-board of a car by means of two bolts and tail-taps. This trough is well adapted for hogs from 75 to 140 pounds.

No. 5 represents the outfit just after completing a job in the field.

No. 6 represents a method which the writer has used for quite a number of years to retain dressings in the case of nail wounds, etc., in the feet of bare-footed horses. When the writer started to use this method, 1½-inch hoop-iron was used for the plates but for some years he has not been able to secure the hoop-iron, so strips of 18 or 20 G galvanized iron are being used instead. A special solid punch is used to cut the holes in the iron; this punch is made somewhat like a blacksmith's pritchel except it is not drawn to a point, but is kept filed on the end so that a segment of iron may be punched out, leaving a hole approximately ⅛ by ¼ inch.

The plate should not be placed directly over the wound to be protected but slightly anterior so that one may inspect the wound without removing the plate and another advantage is when the horse is scuffing his foot along the ground he is not so apt to force dirt into the opening.

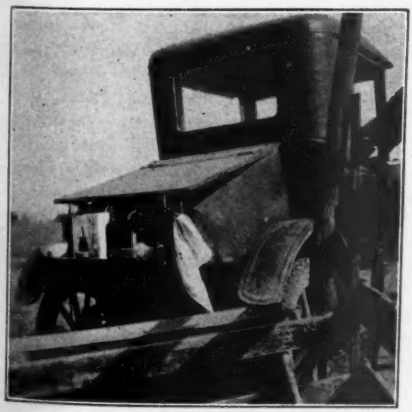


Fig. 5

Fig. 6

Accrediting flocks of fowls that have been found to be free of B. pullorum infection should receive the support not only of the veterinarian, but also the poultryman, as it is the initial step in diminishing the ravages of that malady. A further and equally important problem is the regulation of public hatcheries to prevent the spread of B. pullorum and other infections of poultry. An enormous number of chicks are hatched and shipped each year and unless the eggs for hatching are obtained from healthy flocks, varying percentages of the chicks will be infected. There should also be some regu-

lations relative to the sale of setting eggs to prevent dissemination of infection.

The control of diseases of poultry is essentially a veterinary problem. The successful execution of control measures is dependent upon the practitioner. Effective preventive measures can not be successfully enforced without public sentiment and the public can be aroused to the value of such measures only by publicity.

Diseases of Skin Due to Buckwheat, Clover, Etc.

By A. T. Kinsley

Certain skin disturbances, other than urticaria, occur in white and spotted animals and are apparently caused by some ingredient of certain plants, such as buckwheat, clover, alfalfa, St. John's wort, potatoes, etc. Urticaria and erythematous skin diseases are apparently not as common in swine as in some other animals, although it is possible that the conditions are not always recognized when they do occur.

Fagopyrism or buckwheat rash is a skin disease characterized by erythema, inflammation or necrosis, depending upon the severity of the attack. Certain climatic conditions appear to favor fagopyrism. At least, the condition is not equally prevalent each year. Bruce reported an outbreak of fagopyrism in swine that belonged to the University of British Columbia.

Buckwheat rash is caused by the action of sunlight on white or non-pigmented skin of an animal that has fed on buckwheat. According to some investigators, green buckwheat, just coming into flower, is the most active in causing this disease, although the grain, straw, chaff and bran may, under certain conditions, produce the condition. This condition is frequently observed in swine fed on buckwheat screenings. The simultaneous effects of sunlight and ingested buckwheat—and white or non-pigmented skin, are necessary in the production of fagopyrism.

The nature of the substance in buckwheat that produces sensitization of the areas of pigmentless skin has not been determined. It has been suggested that parasitic fungi are responsible for the condition, but investigation has failed to substantiate this theory. Those cases of buckwheat poisoning, in which the affected animals evidenced disturbances of the nervous system without the usual skin rash, would indicate the presence of some toxin or narcotic poison. Chlorophyl has been incriminated by Kurt as the causative factor. In the "Manual of Poisonous Plants," by Pammel, it is stated that indican, a glucoside, is the injurious substance in buckwheat. The flowering plant is the most toxic. But small quantities of buckwheat are required to produce the condition. The disease usually becomes evident within one or two days after consuming buckwheat, although in some cases the appearance of the disease is delayed for two or three weeks after the animals have had access to buckwheat. During cloudy weather swine may graze on buckwheat without inconvenience, but white or spotted hogs usually show evidence of the disease a few hours after exposure to sunlight.

Symptoms: The disease primarily occurs in white or spotted animals. In mild cases there is erythema, especially of the head and ears, accompanied by pruritis. In these cases, if the buckwheat is withheld from the ration, the affected animals make a speedy recovery, although there will be desquamation and a brownish discoloration that persists in the affected skin for several days. In severe cases there is an intense vesicular or erysipilatous inflammation of the skin. The affected skin areas are intensely red and tumefied and vesicles containing a clear serous fluid, varying in size up to a small navy bean, appear. The ears become pendulous and the swelling in the facial skin and eyelids may obstruct vision. There is an intense pruritis of the involved skin areas and the animal will shake its head vigorously and will rub on posts and other objects with such violence that the affected areas will be lacerated. The vesicular fluid dries and forms scabs. Symptoms evidencing disorder of the nervous system are usually observed. The following description of the nervous disorders in fagopyrism by "Bruce" is typical:

"Affected swine try to jump out of the enclosure, jump into the air with all four feet off the ground, shake their heads and squeal, then poke their heads against the pen or under a log, then lie quiet for three or four minutes, when they would begin again. At times their hind legs are partially paralyzed."

Affected animals may have convulsions. If the lumen of the nostril is diminished by swelling of the mucosa there will be dyspnea. The disease may terminate fatally in a small per-

centage of cases. It is of considerable economic significance because it causes a loss of condition that requires time and feed to regain.

Diagnosis: The diagnosis of fagopyrism entails a consideration of urticaria, although the two conditions are quite similar. The latter is an inflammatory condition of the skin, pigmented or non-pigmented, characterized by tubular elevations which develop rapidly and disappear quickly, while fagopyrism is a condition in which there is erythema or inflammation of non-pigmented skin only, associated with disorders of the functions of the brain.

Treatment: Removal of the causative factors—buckwheat and sunlight, is usually all that is necessary in the relief and cure of the mild cases of fagopyrism. Purgatives are advisable to hasten the elimination of the offending food stuff. Soothing astringents are indicated and should be applied frequently. Animals that are violent and likely to injure themselves should be properly confined and depressants administered.

Clover Disease

Trifoliosis or clover disease is a condition in which there is an inflammatory disturbance of non-pigmented skin. This condition has been observed in cattle pastured on red clover and in horses on alsike clover, and occasionally in swine that are fed recently cut, uncured, green clover, or when pasturing on clover fields. The specific cause of this condition is now known. As in fagopyrism, the development of clover disease depends upon the consumption of clover and the presence of sunlight and non-pigmented skin. The causative factor of clover disease does not occur continuously in clover, for it has been found that when the disease occurs if the clover feeding is discontinued for ten days to three weeks it can then be fed in quantities without producing the disease. The symptoms manifested in mild cases of clover disease consist of redness and tumefaction of the non-pigmented skin and is especially prone to occur in the white markings on the feet and nose. Serum oozing from the tumefied skin dries and forms scabs. The scales usually desquamate within a few days. In the more severe cases the affected skin becomes purplish in color, is extensively tumefied and extremely sensitive and there is marked pruritis of the affected areas. In some of the most extreme cases vesicles containing rather thick fluid are noted. The vesicular fluid dries and forms scabs. Suppuration occurs beneath the scabs. Necrosis of the affected skin areas may occur. Involvement of the skin of the snout and lips interferes with prehension and the affected animals will eat sparingly, or there may be inappetence. Lameness occurs when the skin of the pastern region is involved.

Trifoliosis rarely results fatally, but is of considerable economic importance, because of the loss of condition. The most serious results occur in sows that have young pigs, for in such cases the flow of milk is diminished or entirely suppressed.

Diagnosis: The mild form of clover disease may be confounded with erythema induced by hot slops, although the history of the cases would determine the true character of the condition. The severe form of the disease is similar on a casual examination to cutaneous necrobacillosis, but can be readily differentiated by a careful examination of the cutaneous lesions. Necrobacillosis lesions are crusted over with a gray or grayish brown scab which when removed permits the escape of the peculiar disagreeable, pungent odor characteristic of lesions produced by the B. necrophorus.

Treatment:

Treatment of clover disease depends upon the severity of the attack. In mild cases substitution of some other food for clover is all that will be necessary. In the more severe cases the food should be changed, a purgative administered and a soothing astringent applied to the affected skin. In those cases in which suppuration occurs beneath the scabs, the affected areas should be thoroughly cleansed, the scabs removed and antiseptics applied.

Green Rye, Alfalfa and St. John's Wort

Green rye and alfalfa, under some conditions, may produce a cutaneous erythema and inflammation in swine. According to Rogers, St. John's wort produces inflammatory conditions of the skin, associated with systemic disturbances in cattle and horses, but there are no reports in the available literature of St. John's wort producing disturbances in swine.

Potato Rash

Potato rash has been observed in swine. It occurs most frequently in swine that are fed the refuse or garbage from hotels and restaurants or the waste from starch factories. The cause of potato rash is not definitely known; however, the parings of potatoes, the water in which potatoes are cooked and the wilted potato leaves contain solanin. Solanin may produce systemic disturbances, but it is probably not responsible for the cutaneous condition that characterizes potato rash.

The symptoms of potato rash consist of cu-

taneous tumefactions varying in size from a buckshot to an almond. These swellings are dense and flat, or tabular, and are distributed miscellaneously over the body. The hair on the cutaneous swellings appears to be ruffled. The swellings may broaden on the surface and become depressed or sunken in the center. Several swellings may merge, producing a wave-like effect upon the surface. In the beginning these swellings are quite red, but gradually fade as the swellings become older. The diminishing of the erythema begins in the center of the swellings and extends toward the periphery. There may or may not be marked pruritis of the swollen areas.

The swellings may develop rapidly. In some observed cases the swellings characterizing the disease developed in less than thirty minutes. Likewise they frequently disappear in a very short time, leaving no trace excepting a slight ruffling of the hair or bristles where the swellings occurred. In extreme cases vesicles of large dimension may occur on the swellings. These vesicles usually rupture and practically all of the serum escapes, although there may be slight scab formation.

The treatment of potato rash in swine consists of removing the cause, administering a purgative and the placing of the affected animal in clean, comfortable quarters.

Poisonous Plants

By L. H. Pammel

SUPPOSED SALAL POISONING

Dr. J. N. Hanrahan, of Sequim, Washington, sends the following letter:

"I have mailed you a sample of unthreshed peastraw and an evergreen shrub known locally as salal and would appreciate an examination as to the probable cause of the following conditions that I have found in a flock of sheep.

"History: There are about 500 sheep in one flock, pastured on logged off land which is in the process of clearing. About two weeks ago 25 sheep, purchased 20 miles west of here, and having an environment practically the same, were added to this flock. The man in charge began feeding finely chopped peastraw and a few days later noticed that some of the new arrivals appeared dumpish, would not move unless forced to and refused all feed, finally going down and remaining decumbent until death. The sheep were in good condition, breathing slightly accelerated and there was a greenish, sticky discharge from the nostrils. I did not take temperature or pulse. I had two killed and found the following condition: Submaxillary, prescapulars, mediastinals, mesentric and lumbar glands normal; the lungs, the apical lobe in both autopsies was collapsed and firm and it seemed as if the lungs were firmer than normal; liver, spleen, kidneys and bladder were normal excepting one spleen which showed a diffuse penetrating hemorrhage along its borders; the intestinal tract was practically empty and of fluid consistency; in the rumen I found a few salal leaves; the mucous lining of the abomasum at the pylorus was slightly reddened. I did not examine the head, and did not detect any further pathological condition. I diagnosed the trouble as a dietary disorder due to the mouldy conditon of the peastraw."

The specimen did not arrive. I doubt very much if the peavine is in any way responsible for the trouble referred to. The fact that the animals had been feeding on the evergreen shrub known as salal (Gaultheria shallon) is of interest. This shrub has spicy aromatic leaves; flowers in racemes, corolla urn-shaped and the flowers resemble those of the eastern wintergreen (G. procumbens) from which wintergreen is obtained, although not the only source of wintergreen. Some of it is manufactured from the branches of the cherry or grey birch (Betula lutea). Somewhere in the old numbers of Veterinary Medicine I published a note on the injuriousness of wintergreen. I have also made this statement in my "Manual of Poisonous Plants":

"Drs. Price and L'Engle quite recently mention a case of poisoning from the oil of wintergreen. In this case a child swallowed the contents of a bottle containing oil of gaultheria. The symptoms of poisoning were increased pulse, labored and irregular respiration, hearing impaired, some hallucinations of vision, twitching of heart and weak diarrhea. The child died."

It is a well known fact that quite a number of the members of the heath family are injurious and contain andromedotoxin which is especially common in the leaves of the plant, but also found in the stems and roots. This poisonous substance occurs in the calico bush and plants related to it. It is also a well known

fact that the various specimens of Rhodendron contain poisonous substances like the mountain rose R. catawbiense, R. maximum, and R. Californicum, as well as the California azalea. The best statement I can get in regard to the injuriousness of mountain laurel is by Dr. Bigelow, who says:

"The flesh of the bird (this statement comes from the supposed poisoning from meat poisoned from the plant) impairs the function of the brain and acts directly as a sedative poison, secondarily affecting the digestive and circulatory organs. The symptoms arising in those proving the drug are: vertigo and headache; almost complete loss of sight; pale, somewhat livid countenance; salivation and difficult deglutition, thirst, nausea and vomiting, with oppression and pressure in the region of the stomach, difficult respiration with great palpitation, and fluttering of the heart, followed by an irregular, feeble and slow pulse; weakness, weariness and pains in the limbs; coldness of the surface and great prostration."

From the above notes it seems to me that suspicion might reasonably rest upon the salal and that it is worthy of investigation.

SOME SUSPECTED PLANTS

Dr. C. H. Beckman, of Humboldt, writes as follows:

"Under separate cover I am sending you a number of samples of weeds which are growing in pasture seeded to red clover, alsike clover and timothy hay. There have been a number of cows sick, showing a weed poisoning which I attributed to exhibit "A" which I term wild parsley. However, I would like to have all the weeds classified according to exhibits a, b, c, etc. There have been other cases of forage or weed poisoning this spring on like pastures. Is this weed poisonous at a certain stage of its growth? If so, at what stage? If crop is put up as hay, will the danger be less or as great as in the green state?"

Dr. Beckman sends some thirteen weeds as follows: buckbrush (Symphoricarpos occidentalis), Poison ivy (Rhux toxicodendron), field sorrel (Oxalis corniculata), May weed (Anthemis cotula), pennyroyal (Hedeoma hirta), field cowslip (Androsacea septentrionalis), evening primrose (Oenothera biennis), wormwood (Artemisia biennis), pepper grass (Lepidium apetalum), ground cherry (Physalis pubescens), vervain (Verbena stricta), marsh cress (Radicula palustris), five finger (Potentilla monspeliensis).

A few of these plants are known to be poisonous like the poison ivy which in man causes dermatitis, but so far as I know not generally very injurious to live stock. May weed, like wormwood, eaten in large quantities, is considered injurious, probably also the evening primrose. The ground cherry is probably also somewhat injurious, containing the same principle as nightshade. Probably the most injurious plant is the field sorrel which contains a large amount of an oxalate. The oxalate in this plant is easily broken up. Several cases of poisoning have been reported and I have this to say in my "Manual of Poisonous Plants" about the sorrel: "The fresh juice of this is said to be an antidote against poisoning from the seeds of Jimson weed."

No parsnip was sent, but I suspect in these low pastures there may have been what is commonly called the parsnip but which is really the cowbane (Cicuta maculata). In the spring the roots of this plant are very poisonous. Tetanic convulsions occur when this plant is consumed.

In regard to another species of violet, wood sorrel, Dr. Schaffner reports a case of a boy being poisoned from eating a considerable quantity of the leaves. Another authority notes that children "have been known to die" from convulsions from eating the raw herbs of another species.

The exhibit marked "A" is a five finger and so far as I know is not poisonous, although two or three other persons have raised the question of this plant being poisonous. The question is also asked whether or not the plants are equally as dangerous in hay as in the green state, which is not the case as the toxic principles are decomposed.

MUSHROOM POISONING

A few years ago Dr. O. E. Fischer published in a work on fleshy fungi an interesting paper on mushroom poisoning. The article states that in 1911 more than thirty deaths occurred from mushroom poisoning in and about New York. These deaths occurred mostly through ignorance of foreigners who did not know our species. It is interesting to note that a Japanese writer, Inoko, reports 481 cases of mushroom intoxication in eight years. In 1900 Gillot reported 200 authentic cases of mushroom poisoning, mostly in France; 123 of these were caused by Amanita phalloides. It is found that the mortality from this fungus is extremely high; from 60 to 100 per cent. Ford

and his co-workers found that the poison, one of the hemolytic agents, is an easily decomposed glucoside; the substance is called amanita-toxin. Those who may be interested in the subject will find this a very valuable article.

PLANTS CAUSING HAY FEVER

Dr. Chandler Walker has been making a study of the early spring flowers causing hay fever. The following short introduction is of interest: "Botallus of Pavia was the first medical writer to mention in 1565, patients with headache, itching of the nose, and sneezing from the odor of roses, and during the following hundred and fifty years several writers made mention, as medical curiosities, of patients with catarrh and asthma just at the time of the blooming of roses. But not until March 16, 1819, when John Bostock, an English physician, described his own symptoms in detail, was hay fever recognized as a clinical entity. Bostick describes a sense of heat and fullness in the eyes, with subsequent itching smarting and sensitiveness to light, and later severe inflammation and copious discharge of a thick mucous fluid."

He finds that the wind pollinated plants are the greatest offenders. The poison is a protein substance. In the New England states willow, poplar and maples are the most troublesome. The black walnut is most troublesome in California and the red cedar for the gulf coast states. The coast live oak of California is also a great offender. In the Rocky Mountains certain native poplars and junipers are responsible, and in the east the common box elder, white ash and American elm are held responsible for the spring hay fever trouble.

Helpful Hints in Equine Practice

By L. A. Merillat

OVERDOSING WITH COCAIN

It is decided to perform a bilateral plantar neurotomy in the standing position. Cocain solution is selected as the local anesthetic. A liberal amount of a ten per cent solution is injected subcutaneously over the four proposed seats of resection. The first and probably the first two nerves are resected and the wounds sutured without untoward event, but when the third incision is made, there is some opposition, the leg is jerked away from the assistant, probably two or three times in succession. The patient is sweating about the shoulders, the eyes are staring, the body trembling slightly, and the general appearance of the patient is that of nervousness. It will strike when the leg is picked up. It will shake the head against the torture of the twitch and in short is fast being transformed from a once tractable subject to a veritable fighting fiend. Further attempt to complete the operation in the standing position is futile.

The patient is poisoned with cocain, and the drug is exerting an effect directly opposite to that for which it was given. It is producing hyperesthesia instead of anesthesia.

The remedy is more careful dosing with this poisonous drug. Four per cent solution is strong enough if injected at the right place and delivered en masse instead of spreading it around over a large area. Furthermore, when four nerves must be resected, it is best to cocainize each seat just before the incision is made. The effect of properly delivered cocain is almost instantaneous, and then by cutting down upon it immediately, much less of the solution is absorbed.

CUTANEOUS GANGRENE AFTER FIRING RINGBONES

A horse affected with ringbone lameness, for want of a better treatment, is fired, either with a pointed or edged iron. The hairy pastern is clipped, fired and then blistered. Four days later there is more lameness and the coronary region is swollen and very painful and the patient is sick.

Day after day the lameness is accentuated as the leg swells higher up. On the eighth or ninth day, irregular patches of skin, some large and some small, are found to be dead and crevices (lines of demarcation) are appearing around them and pus is coming from every direction. Soon the patches slough off and if the patient escapes synovial complications and

* In response to requests from readers, we are reproducing this series of practical articles by Dr. L. A. Merillat, written in 1915-16, and considered by many as representing this author at his best. These discussions are quite as applicable to conditions today as they were when first published in Veterinary Medicine, nine years ago. Moreover, they serve to focus attention on a phase of practice which there appears to be a tendency to neglect in some quarters.

death from decubitus, the large granulating surfaces cicatrize very slowly into very unsightly horny scars. The patient either dies or is left permanently blemished after a long annoying convalescence.

The pasterns of horses are susceptible to necrobacillosis and firing like any traumatism may become its exciting cause. Firing higher up never behaves in this manner. It is very evident therefore that firing of the pasterns should be preceded with a disinfection of the skin much the same as if a cutting operation is to be performed. In cities where necrobacillosis seems to be most prevalent in horse feet, firing of the pastern should be done only after the part has been washed copiously with soap and water and then rinsed off with a strong solution of mercuric chlorid. This done, sloughing will always be avoided. Severe firing (broiling the skin) may cause sloughing, but the sloughing therefrom is of a different order than that from necrobacillosis.

NEUROTOMY

In the neural operations performed by veterinarians to relieve various lamenesses of horses, there is always one ugly pitfall to avoid, and that is the breaking down of the articulations deprived of their innervation. Everyone knows of this, yet how often even the older practitioners err by falling into this well known trap. With young practitioners it sometimes occurs from lack of experience, but more frequently it follows operations upon hopelessly lame horses urged upon them by horse dealers. Having seen or heard of the magical effect of neurotomy, the young practitioner until he becomes wiser from experience, usually yields to requests to operate upon lame horses which his better judgment dictates are unfitted for any such interference. The older practitioner says, "No," and the patient passes to some one willing to accede. It is, however, a fact, a confession, that even the most experienced fall occasionally through errors in judgment. Two or three successful neurotomies following one another are very likely to make any veterinarian become so dangerously bold as to resort to this measure even when the incriminating contra-indication stands out conspicuously.

Neurotomy has lost much of the splendor it enjoyed at the hands of American practitioners a couple of decades ago. It was then an everyday operation; now it is more rarely employed. With the passing of the lighter classes of horses and with only beasts of heavy burden to operate upon, it has lost in favor.

Neurotomy is indicated only to relieve lamenesses that are decidedly slight and chronic and which are due to lesions that are neither grave nor extensive. The feet must be normal, sound and strong and the patient must thereafter be given a strictly easy occupation. To wander from the limitations circumscribed by these conditions is to invite trouble in the form of degenerative changes that are sure to bring discredit to every one connected with the enterprise. If, however, we keep sacredly within these bounds, neurotomy may still hold a commendable place among our useful surgical operations, but if we transgress beyond them even in the slightest degree, the beneficial effect will be banished, and justly so.

Digital neurotomy for podarthritis aseptica is curative enough when the lameness or stiffness (when bilateral) is not pronounced, and the benefit is lasting if the patient is never again submitted to fast work or to continuous hard pulling. Otherwise, it is useless, either in not affording any relief or in an early recurrence of a still more severe lameness.

Plantar neurotomy in the forelegs and posterior tibial neurotomy in the hind legs (analogous in almost every particular) are the most dangerous operations of this class performed by veterinarians. Unless exceptional care is taken to select safe cases, no patient will long survive them. Pedal deformities of all kinds, no matter how trivial, must be looked upon as entities that strictly forbid the employment of these operations, no matter whether the afflictions for which they are performed are pedal or not. They are likewise very dangerous for pronounced claudications, particularly when these supervene an extensive inflammatory process that has badly damaged the supporting structure, ligaments, tendons, bones and synovials associated with them. They are dangerous in ringbones and sidebones. We no longer recommend neurotomy for ringbones except as a strictly last resort, as a forlorn hope to prolong the usefulness of a hopeless cripple.

Median neurotomy is probably our best "nerving" operation today. While it may not always effect a cure, it often helps a great deal and is never followed with the breaking down of the lower joints nor with shedding of the hoof. There is, however, one pitfall after median neurotomy, and that is itching of the internal face of the fetlock beginning about the second week after the operation. The patient first licks and then gnaws the part until a large ulcer-like sore is produced. This sore may not entirely heal for months.

It is not the intention here to discredit neurotomy as a routine measure, but rather to draw

attention once more to the unfortunate sequelae that supervene misdirected operations.

HEMOSTASIS BY PACKING WOUNDS

At the end of a sanguinary operation entailing the making of a large cavity-like operation upon fistulae of the withers and poll-evil or the ablation of large tumors, it is a common practice to hurriedly pack the cavity with cotton or oakum and retain it in a compressed state by means of sutures. Bleeding is thus immediately and effectually controlled. Veterinarians seldom stop to twist or ligate bleeding stumps that are sending sheets of blood into the cavity in overwhelming quantities and often from many different directions. Packing is easier and therefore chosen in preference to the more tedious method.

It sometimes happens that horses are sent home in this condition with only indifferent packing. Not having been emphatically impressed with the importance of removing the packing at the given moment, the client leaves it sewed up in the wound forty-eights hours or more. The wound is now emitting an unsavory odor and there are bubbles of froth exuding between the stitches. The region is painful and somewhat swollen, and the patient exhibits symptoms of depression. Removed, the packing is found putrid and when washed the wound is found to be anemic and fetid. The patient has a serious anerobic infecton, probably malignant edema, and may die in a few days. This is likely to occur in out-of-door operations where conditions are not ideal for clean work and where careless practices about general cleanliness prevail at the time of the operation.

The veterinarian packing wounds to arrest bleeding should use aseptic or strongly antiseptic packing and then always leave explicit directions to release it in twenty-four hours by cutting the sutures. Where there were large vessels cut and there is fear of secondary hemorrhage, the packing thus released from its tight incarceration may be dusted over with an antiseptic powder and allowed to remain without further handling for twenty-four hours longer. This allows the circulation to re-establish itself in the previously compressed walls, gives ample time for permanent obturation of the cut vessels and prevents the development of grave infections by admitting air into the cavity.

The following case illustrates the danger of allowing wound packings to sojourn too long:

Among other operations performed at the surgical clinic of a veterinary association several years ago, was one for fistula of the withers. The large wound made on the side of the neck was packed with oakum soaked with a solution of mercuric chlorid and sutured tightly to control the copious bleeding. The horse was turned over to the owner without any explicit directions for the treatment of the wound. Four days later the veterinarian who had sent the patient for operation was informed that it was not doing well. Without suspecting that anything very unusual had occurred, he postponed his visit until the next day—the fifth day after the operation. On examination he was astounded to note that the packing had not been removed and that the patient was in a dying condition. The withers were enormously swollen and sounded like a drum when tapped upon with the fingers, bubbles of froth were oozing from the wound from end to end between the sutures. When the sutures were cut, they resounded with a thud and released the tightened packing and quantities of pent-up gas. The walls of the cavity were reddish white and steamed with heat; when sectioned there was no bleeding; only a frothy liquid exuded. The flesh was gangrenous. The diagnosis was malignant edema and the patient died on the sixth day.

This untoward result is one into which we may be drawn through the stupidity of a client or through our own indifference in giving directions for post-operative treatment. The blame for a death is, however, always placed upon the surgeon.

Hemostasis by the torsion of vessels or by ligation is always preferable, but when compression by packing and suturing is chosen in preference, it is the surgeon's duty to see that the sutures are cut at the end of twenty-four hours.

DANGERS OF RECTAL EXPLORATIONS

A veterinarian of many years of experience, and a very conservative and careful one at that, was once asked in a rather off-hand manner whether a certain mare was pregnant. With a glance over the subject, he replied that there was no outward evidence of such a state, and added nonchalantly that a rectal exploration might enable him to determine. Upon being told that the information would be well worth knowing at that time, he rolled up a sleeve, anointed the hand with vaseline and made several excursions into the rectum to evacuate the accumulated feces. When the evacuation was complete, the hand was a little bloody here and there. The doctor now remarked that the rectum was dilated and had been impacted with

more than a normal stoop. He, however, passed in the arm again to examine the uterus and in doing so perforated the thin rectum. The subject died seven hours later. A law suit? No! The doctor wrote out his check for $125 on the spot and avoided the trouble of defending himself.

The writer has had a number of similar experiences and finds that assistants must be repeatedly warned against harsh rectal manipulations to avert accidents of this character. The danger is greatest in old horses and in horses whose rectums have been repeatedly impacted from various causes.

Items of Interest to the Practitioner

By A. T. Kinsley

Pellagra is not a communicable disease. It can be prevented by providing a proper diet.

It is in the power of man to cause all parasitic disease to disappear from the world.—Pasteur.

It requires about five pounds of feed to produce one pound of eggs, a ratio that compares favorably with the conversion of feed into pork.

The major portion of the feed is used in growth by the young animal. Thus, it is thought that proportionately more feed is required to fatten a young animal than is required to fatten one that is mature.

According to a report of the United States Public Health Service, the spleen index as ascertained by palpation, is valuable as a parasitic index in determining the prevalence of malaria in boys in the Mississippi Delta region.

The per capita consumption of eggs has been gradually increasing during the last few years. The average consumption in 1923 was 18.6 dozen or approximately two eggs every three days.

Heifers sired by scrub bulls, generally speaking, show no increase in production over their dams, but heifers sired by pure-bred bulls are found to be larger producers than their scrub dams. This is the keynote in eradicating the scrub bull in dairy herds.

There has been a slight increase in the per capita consumption of beef. In 1923 the feeder cattle shipments back to the feed lots decreased about 6 per cent. These two factors indicate that the future price of beef will advance, thus favoring the cattle feeder.

An imitation silk has been made from the glue obtained by processing swine ears. This imitation silk produced from glue is so similar to the genuine that experts are required to detect the difference between silk derived from worms and glue. The adage "you can't make a silk purse of a sow's ear" must be relegated to days gone by. Popularizing this fact should increase the respect for swine.

Only ten per cent of the world's wool supply is produced in the United States, although 25 per cent of the world's output is used in this country. This fact combined with the recent price for lambs would indicate that sheep production will be profitable until the home demand of wool is supplied.

According to the reports of the various life insurance companies, the losses of human life from influenza in the United States would exceed 300,000 which is six times greater than our total losses killed in the recent war.

Market demand for guinea fowls is increasing because the American people are beginning to appreciate the fact that the flesh of the guinea is very similar to that of wild fowls. The guinea fowl is subject to about the same diseases as other barnyard fowls. They do not thrive unless they have considerable range and they prefer to roost in trees, although they can be trained to roost in a hen house.

Some 400,000 head of cattle have been exported annually from Queensland, Australia, as frozen beef. South America has been encroaching upon the dressed beef trade and unless Australia perfects an efficient method for chilling beef they will lose the foreign trade.

The cause of infectious keratitis (pink eye)

in cattle has not been identified. Bright light and especially sunlight, intensifies the disease therefore affected animals should, if possible, be kept in sheds or barns. Mild antiseptic washes and proto-iodid of mercury ointment topically applied is of value.

Several carloads of heifers and cows have been spayed in the Kansas City Stock Yards recently and shipped to country points for feeders. The interesting point in this connection is the fact that the spayed animals are shipped the day following the operation. One carload of 30 head was shipped to Ohio and a report one week after arrival stated that all animals were apparently normal.

Mosquitoes will enter and leave a cistern or other receptacle containing water through perpendicular pipes that have a diameter of one inch or less, even if such pipe is as much as 14 feet in length. They will not enter through a horizontal pipe when it is 12 feet or more in length, although if hatched in a cistern they will pass out of a horizontal pipe if there is no other exit.

An authentic case of measles occurred in a child in the Minneapolis General Hospital as a result of transfusion of blood from a woman that was apparently in the incubation stage of the disease. This indicates that the virus of measles is in the blood. Further experiments should be planned and executed before this theory is accepted. It also indicates the necessity of painstaking search of individuals from which blood is to be obtained for transfusion.

Cannibalism in chicks may be manifested by "toe picking." This condition may be due to hunger in some flocks. Toe picking also occurs in chicks that are not busy. Such conditions can usually be avoided by feeding little and often and by keeping the chicks busy picking at something—such as green grass. Outdoor runs appear to diminish cannibalistic tendencies. Chicks that have had their feet injured by toe picking should be treated by the application of an astringent antiseptic or tar. The affected chicks should be removed from the rest of the brood.

Practically all humans are or have been infected with the tubercle bacillus. Two people die every minute in the world of tuberculosis. There are more than 100,000 humans who die of tuberculosis annually in the United States. The economic loss in the United States exceeds one billion dollars each year. Infants and invalids may become infected by consuming milk contaminated with the tubercle bacillus. There are approximately 24 million dairy cows in the United States and some of them are tuberculous, and no doubt contamination of milk with the tubercle bacillus does occur. Although such instances may be rare, this information should be sufficient to stimulate bovine tuberculosis eradication.

Missouri produces about fifty million chickens each year; however, only about thirty million survive; that is, approximately twenty million or nearly two-fifths die. The principal loss occurs in the little chick and are the result of not only the ravages of disease but also inexperience of the producer and the lack of facilities for caring for the flock. The loss of poultry in Missouri costs the industry over $2,000,000 annually and the losses in other states are proportional to the losses in Missouri. Thus, the veterinarian should appreciate the significance of poultry diseases which cause losses which are equal if not in excess of the losses of cattle and hogs. The same general factors apply to the losses of chickens, swine and cattle, viz: failure to recognize the value of sex hygiene; improper feeding; insanitary surroundings; and improper management. These excessive losses are preventable and the future of the live stock industry is dependent upon diminishing infant mortality in farm animals.

It has been shown at the Wisconsin experiment station that regular doses of dried thyroid powders induce plumage of the female type in roosters.

The cancer problem and particularly the cause of these new growths has not been solved, and is still creating considerable interest in experimental medicine. Burrows has found that cells normally form a substance which, if present in sufficient amounts, will cause them to grow or migrate. The final outcome of the cell is determined largely by circulation. If the circulation is extensive and there is a relatively rapid change of blood in the part, cell products are removed before they exert any noticeable influence upon cell metabolism. But, if the circulation is retarded, cell products accumulate and appear to exert a marked influence upon the cells in that area; thus, cells in pigmented moles, warts and cicatrices frequently become unduly stimulated by their own prod-

ucts and multiply rapidly, thus producing malignant tumors or cancers. This in part appears to account for the occurrence of cancers; however, it does not explain why certain types of cancer such as those occurring in mice can be transplanted artificially.

Lightning Stroke as it Affects the Lower Animals*

This subject concerns the veterinary profession to a great extent, and, at times, I must confess it is most difficult to arrive at any definite conclusion, owing to the vagueness of the symptoms presented either ante-mortem or post-mortem.

Usually the first intimation one receives is to the effect that a client has had an animal killed by lightning, and, providing there has been a severe thunder storm (which is usually accompanied by very vivid and forked lightning, with damage to trees and property in the immediate vicinity), it is not difficult to diagnose the cause of death, even without a post-mortem examination.

In these cases, without exception, or with very few exceptions, there is external evidence of singeing of the hair or wool of the dead animal or animals, which, along with the edematous condition of the carcass, rapid decomposition and flexibility of the limbs, is quite sufficient evidence as to the manner in which the animal has met its death. On opening the carcass in these cases, one finds the blood in a fluid condition, and a total absence of any other pathological lesions.

As veterinary surgeons, we are frequently requested by insurance companies to inquire and report on suspected cases of death by lightning stroke—these cases having been reported to the agent, and by the agent to the insurance companies. Consequently, a considerable time elapses before a post-mortem examination can be made, making it a very difficult task to arrive at a correct decision, the changes which have taken place in the carcass and the viscera being such as to obscure the real cause of death. This is particularly noticeable in cases of poisoning, such as poisoning by lead, yew, rhododendron, and a variety of other poisons with which food at times becomes contaminated, and it is sometimes only after a very minute examination, and not always then—without microscopical and, or, analytical examination—that the cause of death is disclosed.

Other diseases which can be, or are, frequently confounded with lightning stroke are as follows:

1. Anthrax. Here one meets with sudden death, the animal having apparently been in perfect health a short time previous to death. Of course, we all know it is customary to find blood issuing from the nose and a bloody evacuation from the anus, but it frequently happens that these well known symptoms are conspicuous by their absence, and it is only the use of the microscope that will reveal the disease in a limited number of hours after death. Should the examination be further delayed, it by no means follows that even with the aid of the microscope one will with certainty diagnose the disease.

2. Blackleg. Here again, if any length of time elapses between death and the examination, it is not always an easy matter to say definitely whether the animal has or has not been killed by lightning. In fact, I have seen this condition mistaken in all good faith for lightning stroke, particularly so if more than one animal is found dead in the vicinity.

3. Pulmonary apoplexy. Again, a disease which quickly ends fatally with rapid decomposition and edematous swelling of the carcass, which is quite easily mistaken for lightning stroke.

4. Parturient apoplexy. Cows calving in open fields and with their calves left with them will, as you know, develop milk fever, and they will, for lack of attention, succumb to the disease. There is nothing easier than for an unscrupulous person to take away the calf and report the case as one of lightning, and this is an ideal trap for the unwary.

5. Diseases of the heart, such as fatty degeneration, hypertrophy, and even functional disorders, will, under certain circumstances, end fatally, and can likewise be confounded with lightning stroke.

I affirm, without the slightest hesitation, that insurance companies are frequently called upon to pay claims for the loss of animals supposed to have been killed by lightning stroke when

* Discussion at the Derbyshire Division, British Veterinary Association, meeting Derby, April 8, 1924, and reported in The Veterinary Record, June 7, 1924.

their deaths are attributable to other causes, particularly in the loss of sheep, where the decision and value are often left to the discretion of the owner and his neighbors.

In sheep there are a variety of causes of death closely simulating lightning, which, I am strongly of opinion, all have their origin in the digestive organs. In other words, there are hundreds of sheep which die annually owing to indiscriminate and harmful feeding, some of which are certified to be due to lightning stroke.

So far I have dealt only with deaths from lightning, but it is not unusual to be called upon to investigate suspected cases of lightning stroke in animals that have been reported injured, the electric shock having been insufficient to cause death.

I must admit that my experience in these cases is almost nil, and I am strongly of opinion that if an animal receives a stroke which is insufficient to cause death, the symptoms very rapidly pass off, leaving the animal very little, if any, worse for the shock.

I can, however, conceive that in a susceptibly nervous animal, paralysis, in some form, might supervene, and also have a fatal termination. I have occasionally met with cases in cattle which have been somewhat baffling, such cases on post-mortem examination proving to be due to tuberculous meningitis or other brain lesions.

I should like the opinion of this meeting on the susceptibility of sheep to the electric fluid. Are sheep, as a whole, more susceptible than other animals, and, if so, why?

E. Marrison

ANIMALS STRUCK BY LIGHTNING AND NOT KILLED

I am of the opinion that in practically all cases where animals are struck by lightning and not killed, the sight is impaired in some way or other. The greater number of animals reported to have been struck and still living will prove, on careful examination, to be suffering from tuberculosis in some form.

Personally I am also of the opinion that there are cases of animals being struck by lightning without any external lesions being present. Last year was the worst I remember for the number of claims for lightning, and in practically all the cases I saw there was singeing present. In one case three horses were lying together, and the lightning had ploughed up the ground, gone through a wall, and killed two beasts on the other side.

I think where there is evidence of a storm, and an animal is found dead, it is often difficult to determine whether lightning is the cause or not, but if a post-mortem examination does not reveal any other cause, it seems fair to assume that it is lightning.

For the last ten or twelve years, it has been my practice never to examine for a client an animal supposed to have been struck by lightning. The client is instructed to report the case to his insurance company, so that the company can have the chance of sending its own examiner. That course saves a good deal of trouble.

F. T. Prince

LESIONS IN LIGHTNING STROKE READILY MISTAKEN FOR BLACKLEG

In the Western Counties, reputed to be very bad for lightning, in one day I examined twenty-seven cases in different places. In one case nine sheep under a tree were singed. I opened four or five of them, and was struck by the lesions which appeared under the skin markings. They were very typical of blackleg, and, short of the absence of smell, there was nothing to show they were not blackleg lesions. I have made a good many post-mortem examinations wherein I thought the conditions very much like blackleg, and I think these cases require very careful handling when the smell is absent.

The only case I have come across of an animal being struck and living was a ram. Four days after it was supposed to have been struck, it was paralyzed and blind, and there was a distinct singe on the forehead and neck. It was killed and, nothing else being found on post-mortem examination, the only conclusion that could be arrived at was that lightning stroke had caused the lesions. In my experience, singeing and skin markings are rare.

W. F. Aston

OWNER USES HOT IRON TO ESTABLISH DEATH BY LIGHTNING

My experience has not been that carcasses are usually externally marked in lightning stroke, though I do not maintain that my experience has been particularly extensive. With me it has been the exception rather than the rule to find carcasses singed, and I have seen cases where animals have been killed in numbers, where fences and trees have been splintered.

There was a classic case locally where the markings had been rather artfully applied with a hot iron, but it came to light. I should like to know how one may detect the difference between singeing by lightning and a hot iron.

I think a lot of animals are struck by light-

ning without being killed. If an animal is found in a high state of excitement with partial paralysis and there has been a storm in the neighborhood, with property and trees damaged, I think there is good evidence that the animal is suffering from lightning stroke. We know it is common for the human subject to be struck and not killed, and I see no reason why animals should not be affected in the same way.

I know of a case where five calves were struck in a barn, of which the top was partially ripped off. Two calves were killed, two were ill, and the other undamaged. It did not appear as though the two which were ill would be any further good, and they were destroyed. Not one of the lot was marked.

I do not think sheep are more susceptible, but there are more cases among them because of their habit of running together.

Major T. V. Bagshaw

MICROSCOPIC EXAMINATION IN LIGHTNING STROKE

In many cases to which I have been called, I have found it very difficult to determine if death was due to lightning or not. If we look up text-books, we can find nothing definite to go upon in this condition. I think it is wrong for veterinary surgeons to go when called by clients and certify death by lightning before the insurance company's surgeon arrives. It makes the matter very difficult at times for the second surgeon.

I should like to know what experience members have had with microscopic examination of blood in these cases. Is it not a fact that the blood corpuscles are disintegrated? If we find the corpuscles intact, I think we can take it that it is not a lightning case.

P. M. Evershed

CIRCUMSTANCES AID IN DETERMINING DEATH BY LIGHTNING

I think it is an established fact that it is very difficult to diagnose a lightning case with certainty unless we take into account the facts that there has been a heavy storm, that cattle were seen prior to the storm in good, healthy condition and dead afterwards. If then, a post-mortem examination fails to reveal anything else, we must conclude it was lightning.

External bruising, in my experience, is not particularly common. I have some across one case where there was singeing in a wavy line from the horn to the anus of a cow, which was down and paralyzed, and the assessor gave permission for slaughter. In another case of a milch cow, the animal was very bad behind and could not walk straight, while she was also light in milk, but in five or six days she was quite all right, and a compromising amount was paid by the insurance company.

Mr. Prince's suggestion of not examining for a client is all right as far as it goes, but it does not seem right to give a blank refusal to examine. I would certainly go on the instruction of a client, and if I thought it was lightning, tell him so. It would then be the time to tell the client that one would not certify.

In cases of anthrax, we need make no mistake unless the carcass is in an advanced state of decomposition, and blackleg is in the same category. I do not think sheep more susceptible than other animals to lightning.

Microscopic examination of the blood might be a great aid, but we encounter disintegration from other causes than lightning stroke.

J. S. Furness

DIAGNOSIS OF LIGHTNING STROKE BY ELIMINATION

I agree with those who say they often get cases of animals killed by lightning stroke without any marks showing at all. I have, however, never given a definite opinion unless there were definite signs. My practice is to say that the symptoms are consistent with lightning stroke.

I believe it is a fact that lightning is far more deadly when moisture is on the ground, and this may account for some of the cases where there is no history of a severe storm.

It would be better if the companies could have some definite principles to work on, but on the whole they are very fair. I would suggest that with a small extra premium they agree that if the veterinary surgeon can find no other cause for the death, they will pay for lightning stroke. That would lighten considerably the duty of the examiner.

Captain O. V. Gunning

VARYING SUSCEPTIBILITY TO LIGHTNING STROKE

The more I have to do with lightning stroke, the more baffling I find it. I am of the opinion that in different species of animals there are varying degrees of susceptibility so far as shock is concerned, and the one most liable to shock effects is the nervous animal galloping about in a storm.

I remember one case of a cow under a tree,

the bark of which was flung a long distance away into a lane, but the cow was not singed. Yet another cow, in another case, standing thirty yards out in a field, was worse marked than any other animal I have seen. My experience, however, is that singeing is exceptional. I believe it is possible for an animal to receive a shock and die without any lesions being visible under the skin, although that is also exceptional.

In a case to which I was called a horse was lying dead, and another was standing or walking as though it had fever in the feet; it was paralyzed, and the jaw dropped, and one eyelid and an ear. Another veterinary surgeon gave the opinion that the horse would not do any good. Two months later it had gotten fat; there was opacity of the eye, the eyelid and ear dropped, and there was a disfigured mouth. Eventually the insurance company took it over.

In a stable that was struck and the wall split through, an animal was found deaf and blind. It was all right in about a week.

We should be very careful in lightning cases and remember there can be lightning on a farm without wakening the farmer up with the storm. I do not think we are justified in telling a client outright that we will not see a suspected case of lightning stroke, but that we should be prepared to hold a post-mortem examination on a suspected case.

J. C. DeVille

DETECTING ANIMALS SINGED BY IRONS

In my experience it is general to find external evidence of lightning stroke, but a lot depends on the length of time between the stroke and examination. Heavy rain will often wash the evidence away, and I think that is what had happened in most of the cases where members said they had found no evidence of singeing. I think it better to leave it to the discretion of the insurance companies to make examinations, but to be present at post-mortem inspection.

We can safeguard against singeing by irons as distinct from lightning stroke by post-mortem examination. If there is singeing by hand, we do not find marks on the carcass underneath the skin. I should be very careful about giving a certificate for lightning if I find no singeing and no hardening of the skin.

In the case of an excited animal, partially paralyzed, I would not attribute the condition to lightning stroke if there was no external evidence or evidence of a storm.

In asking about the susceptibility of sheep, I was thinking of isolated cases about the country. Sheep have higher temperatures than cows or horses, and there is more moisture about them.

It is probably a good rule to examine the blood corpuscles under the microscope, though they can be found broken down under certain other conditions.

E. Marrison

STABLE VICES AND THEIR PREVENTION

Stable vices are objectionable habits of horses, practiced while idle, as in the stable or on the picket line, and are caused usually by nervousness and restlessness, but not infrequently by poor stable management.

As a general preventive to their contraction, the animals should be kept occupied and out of the stables as much as possible during the day.

The most common vices are, weaving, windsucking, cribbing, biting, kicking against the stall, gnawing the woodwork, eating dung, greedy feeding, tearing blankets, and halter pulling. Most of these when once acquired are incurable, but they may be partially or wholly prevented temporarily at least.

C. E. Jewel,
Lieut. Col., V. C. (Retired).

TREATMENT FOR "SUMMER MANGE" IN HORSES

In the June issue, I noticed an inquiry under the heading, "Chronic Skin Diseases of Horses," signed "C. M. M.," with reply by Dr. E. L. Quitman.

The condition described comes under the observation of every practicing veterinarian during the hot summer months and is in my opinion a non-parasitic affection, a form of eczema commonly called summer mange.

After using all kinds of general treatment without results, I concocted a preparation for local application that comes nearly being a specific.

I do not claim that it will effect a permanent cure in all cases, as some may recur, but if this preparation is used in the spring at the appearance of the rash, one course of treatment will generally suffice for the season, the hair will return on the denuded surfaces, the eruption and itching will disappear and allow the animal to work without inconvenience.

The prescription used is as follows:

Lac sulphur ..... ℥1½
Oil of tar ..... ℥2
Creolin ..... ℥1
Ol. gossypii qs O1
M. Sig. Apply to affected parts with brush or cloth once daily.

My reason for using cottonseed oil in place of the heavy mineral oil suggested by Dr. Quitman is that the vegetable oil is lighter and more readily absorbed and not so liable to clog the hair follicles and interfere with perspiration and heat dissipation.

A. J. Peterson, D. V. M.

Lindsborg, Kansas

STRONGYLOSIS IN HORSES

About two months ago, i. e., about the 1st of April, I was called to treat a horse that the owner found down in the field. This horse had been running in a corn stalk field and had access to a stack of mouldy clover hay. On examination, temperature, respiration and pulse were approximately normal but the animal was unable to rise.

From the history and symptoms, a tentative diagnosis of forage poisoning was made. An entire change of feed was recommended. A purgative was administered and a general stimulant prescribed.

The horse was raised with a sling on the following day and after supporting him for a while he was able to walk, and in two or three days' time he was apparently normal in every way for about ten days when he went down, and although the owner raised him with slings daily, he finally died. Circumstances prevented an autopsy on this case.

About the time that this horse died the owner bought another team and about the first of May the owner called, stating that both of the recently purchased horses were down and manifesting the same general symptoms that the first case did. Being unable to go at once on these cases, another veterinarian was called and made a diagnosis of forage poisoning. One of the horses was raised with the sling and apparently recovered but had a relapse in a few days and died. The other died rather promptly after the onset of the disease. Neither of these horses were autopsied. There was one other horse on the premises when the other veterinarian was called to see the two affected animals and that horse was given a preventive dose of botulinus antitoxin. About two weeks later this horse was found down in the pasture and the other veterinarian and myself were called to conduct an autopsy, which revealed myriads of strongyles in the large intestine, and an excessive quantity of fluid around the brain and spinal cord, all other structures being apparently normal. A sample of blood was collected and forwarded to a laboratory for examination but the findings were negative.

As a result of the autopsy and laboratory findings the diagnosis has been changed to strongylosis. However, it is rather puzzling to understand why the recently purchased team acquired the disease so promptly. Will be glad of any suggestions you may have to offer.—H. A. M., Iowa.

Reply: Your interesting report has been received with considerable interest. From the development of several successive cases on the same premises it is evident that there is some etiologic factor or factors in the feed, water or general surroundings. Uncertain gait and more or less paralysis particularly of the posterior extremities are common in intestinal strongylosis. Several cases of strongylosis have been observed in which the affected individuals were unable to rise but when raised to their feet they were able to stand, walk and some of them even pull heavy loads. Such cases may go down and not be able to rise; however, they rarely succumb excepting from complications.

It would seem probable that the mouldy clover may have been a factor in the first case and such feed, if consumed, would be an important factor in the other cases. The fact that the last horse developed the disease within two weeks after the administration of botulinus antitoxin would apparently eliminate botulism, a disease that is probably not very common in equines.

From the available evidence at this time it seems probable that strongyles are the important causative factor in the occurrence of the malady in horses that you have reported.

A. T. K.

NAVEL INFECTION IN COLTS

I have a mare and colt under treatment at present. She has lost her last three colts from navel ill, all dying in less than ten days from time of birth. She carries them full time and has been bred to a different stallion each time. The present colt is 21 days old and was O. K. until the seventeenth day, when it went lame in one leg. It eats good and seems to feel good, but the lameness is getting worse. The colt has received three doses of navel ill bacterins, and the navel has been painted twice daily with iodin.

The mare foaled in the orchard in what I

thought was an ideal place, as the grass was fine and no other stock of any kind had ever been in the lot. The mare and her colt were kept there for 17 days when the colt was seen to go lame. They had a fine shelter, well bedded with clean straw and shredded fodder each day. I have given more bacterins and used calcium sulphid and echinacea tablets recently, and intend to use hexamethylenamin tablets later.—H. G. H.

Reply: There isn't a thing to be added to the treatment you have already used in this case. When one has used bacterins, echinacea, calcium sulphid and local disinfectants, one has done about all that can be done. The prognosis in this case is grave. The late onset of the disease is the only favorable symptom, and this is favorable only because the animal resisted for so long the infection which must have been present at birth. It is believed now that navel infection is not infrequently contracted in utero. Should pus collect in the infected joint, it should be aspirated and ether injected.

TREATMENT FOR "DOWNERS"

In the June issue, I noticed an inquiry from A. H. W. on post-partum paralysis, with reply by Dr. DeVine. I should like to say a few words regarding the treatment of "downers." For more than thirty years I have been attending to the physical needs of the good old "Foster Mother of the Human Race," and I have learned some things that may be helpful to some of the younger men, and if so, I am glad to pass it along. I have had a large number of these cases throughout the years of my practice, and I have had wonderful success with all. I have never lost a case that was not beyond hope when I arrived, and I have never had a cow go down the second time.

There are several factors that may cause paralysis in a cow. But whether the case is one of post-partum paralysis, absorption of toxins from a putrid afterbirth, forage poisoning or what not, the same general line of treatment, with variations to suit the specific case at hand, is used. When a cow goes down, it is a serious condition, and heroic methods of treatment are indicated. To my mind, the administration of tonics after the usual custom is a waste of medicine, time and cow flesh. I heartily agree with Dr. DeVine that there are times when heroic doses are needed, and better not give any than to give short of what is really needed.

When I find a cow down, as for instance the cow about which A. H. W. inquired, my way of handling the case is as follows: If rumination and peristalsis are absent, I give physic and rumen compound to start action of the bowels; double the first dose of rumen compound and follow every six hours with the regular dose. Now here is where some may throw up their hands and shout "Piffle!" But try it and see the results. Give three heaping tablespoonfuls of powdered nux vomica with sixty grains calcidin (Abbott) every four hours until four doses have been given; then the same sized dose every six hours for four more doses. By this time the patient will more than likely be up. As soon as the bowels move, give large doses of sulphocarbolates to move out the toxins. If the bowels are moving, start with sulphocarbolates at once.

In cases of paralysis from the absorption of toxins from a putrid afterbirth, give 6 to 8 c.c. of mixed infection bacterin, and as soon as possible cleanse out the uterus with saline solution to remove the putrid stuff.

Each individual case needs adjuvant treatment suited to the case that any practitioner should be able to tell. The main point is big doses of nux and calcidin. In place of the small dose first, with increasing size, as Dr. DeVine suggested, I give the big doses first and decrease in such cases as are under consideration. The system must be rapidly saturated to obtain the quickest results.

I don't know whether I have made myself plain or not, but the point I wish to make is that nux vomica should be used to the limit right off the bat, the case watched closely and the drug reduced as necessary. Calcidin or the iodids are more often used in too small rather than too large doses. To use a slang expression, "Sock it to 'em" right at the start. Adjuvant treatment is, of course, important, also bacterins where indicated, sulphocarbolates, etc.

As stated before, this line of treatment has never failed me, and I believe if used judiciously by others will meet with the same success. It has given me the reputation of being able to raise the dead, and any time I see one of these cases I approach it with all the confidence in the world in my ability to cure the case.

I also find many times that the addition of five or six ounces of special steamed bone meal daily will help. Many heavy producers exhaust their supply of mineral matter and when calving time comes go down as in the case reported by A. H. W. At least, this is my opinion, and it has been borne out in practice.

I am far more prone to receive than to give advice, but some things are firmly fixed in my

mind from repeated success, and I am therefore willing to pass the ideas along for what they are worth.

B. T. Hopkins, D. V. M.

Lake Worth, Fla.

TREATMENT FOR INDIGESTION IN HORSES

I see in the July issue, page 404, that I am using a prescription containing four ounces of barium chlorid. I am sure that the first horse that will take such a dose will never have to take another one thirty minutes after.

Here is the prescription that I have been using for the past eighteen years and which has cured 100 per cent of my cases of stomach and intestinal indigestion.

Barium chlorid (Merks)	3 iii
Strychnin sulphate	gr. ii
Lobelin sulphate, 1/10 gr.	tablets ii
Boiled water	lb. i

Dose: 20 cc intravenously; 10 cc, 30 minutes after the first dose; 10 cc, 60 minutes after the second dose.

I have never had to give more than three doses, and often only two, and I don't need any stomach tube.

Sherbrooke, Quebec. J. A. Janelle, V. S.

WOOLLY-POD MILKWEED POISONS CATTLE AND SHEEP

Woolly-pod milkweed, a plant growing rather abundantly in parts of western California, has long been suspected by stockmen of being poisonous to cattle and sheep. Recent investigations by the United States Department of Agriculture have shown that it is very poisonous to these animals. Although no cases have been reported, it is thought that it may also be poisonous to horses. Animals are not likely to eat it except when other forage is scarce, but it is particularly dangerous as only a small quantity is necessary and the dried plant may be eaten in hay. As little as 0.1 of a pound per hundredweight of animal may poison and 0.22 of a pound of the green material or its equivalent of dried plant per hundredweight may cause death.

A detailed account of the experimental work and descriptions of the plant with photographs have been published in Department Bulletin 1212, The Woolly-Pod Milkweed as a Poisonous Plant, by C. D. Marsh and A. B. Clawson. Copies of the bulletin may be obtained, as long as the supply lasts, by writing to the Department of Agriculture, Washington, D. C.

FLY REPELLENTS

Fish oil	100 parts
Oil of tar	50 parts
Crude carbolic acid	1 part

Oil of tar	½ gal.
Cottonseed oil	½ gal.
Naphthalin powder	4 ounces
Crude carbolic acid	½ pint

Common laundry soap	1 pound
Crude petroleum (or fuel oil)	1 gal.
Powdered naphthalin	4 ounces
Water	4 gals.

Shave and boil the soap in the water, stirring until thoroughly dissolved. Dissolve the naphthalin in the crude oil or in the fuel oil. Mix the two solutions.

Powdered naphthalin	1 ounce
Lard oil	1 pint

Mix and apply with a sponge, cloth or wad of oakum.

Naphthalin, powdered	4 ounces
Kerosene	1 pint
Soap	¼ to ½ pound
Water	1 gal.

Dissolve the naphthalin in the kerosene. Shave and dissolve the soap in boiling water. Let cool and add the kerosene and naphthalin solution. This is stainless and will not gum up the coat. It may be used in a spray gun or otherwise applied.

Crude carbolic acid
Oil of tar
Cottonseed oil, aa 1 gal.
M. et sig. Apply as a fine spray.

Powdered resin
Shaved soap
Fish oil
Oil of tar
Kerosene aa 1 part

Boil the resin, soap and fish oil with enough water to dissolve the resin; stir well with three parts of water and add the kerosene and oil of tar. Apply as a spray.

As a fly exterminator for stables, the following is effective:

Molasses	20 parts
Water	80 parts

Add 40 parts of arsenic; in making this mixture, the arsenic should be stirred for about twenty to thirty minutes in the water while it

is boiling, which will dissolve a considerable portion of the arsenic. Then it may be allowed to partly cool and the molasses added. For use, one quart of the above mixture is added to fifty gallons of warm water, and well stirred before using. This diluted solution may be sprayed on cement floors or placed in pans around the stable. Such pans or containers should be so protected that dogs, cats, poultry and other animals cannot get to the fluid.

Spraying of livestock with fuel oil is reported to be an effective means of fighting the scourge of flies. It is said that fuel oil does not burn the skin of the animals as does the pure crude oil. Daily spraying of the stock is necessary to provide adequate protection.

Creolin (or any coal tar emulsion)	36 ounces
Fish oil	32 ounces
Kerosene	24 ounces
Whale oil	20 ounces
Oil of tar	12 ounces
Naphthalin	8 ounces
Laundry soap	16 ounces
Water q. s.	10 gals.

The soap should be dissolved in enough hot water to assure a perfect solution and the naphthalin in the coal tar emulsion and kerosene before mixing the other ingredients.

By soaking a sponge or cloth with this mixture and stroking it over the body of the animal in the direction of the hair, a maximum of effect with a minimum of irritation is obtained.

It is never advisable to soak the skin with any active fly repellent owing to the erythema such applications always produce when repeated day after day.

PRONUNCIATION OF "HUTYRA" AND "MAREK"

Please indicate the correct pronunciation of Hutyra and Marek, the veterinary textbook writers. I hear it called "Hu-ty'-ra" and "Ma-rek'" and "Hoo'-tery" and "Mar'-eck" and "Hoo-te-ray'" and "Marck," etc., till I'm dizzy.

—A. C. W.

Reply: Dr. John R. Mohler in discussions at meetings always pronounces these names "Hu-tee'-ra" and "Ma'reck" with the "a" in the last word broad. Dr. A. Eichhorn accents the words the same but sounds the "a" in "Marek" as in "ask."

As Dr. Mohler is careful in his pronunciation and Dr. Eichhorn is personally acquainted with the author and as both are linguists and familiar with the mother tongue of the authors, and as they practically agree in the pronunciation of these words, their pronunciation may be said to be correct.

THE VALUE OF MILK AS FOOD

The results of an experiment to test the comparative food value of milk and oatmeal with coffee and buttered toast are quoted in a recent bulletin of the Nutrition Laboratory of Battle Creek Sanitarium. Judging by the photographic record, oatmeal and milk win hands down.

In the experiment, four male rats of the same litter were taken. Two were placed in one cage and two in another. In one cage the animals were fed upon nothing but buttered toast and coffee. Those in the other cage were given oatmeal and milk. The results in the rapidity of growth of the animals were most striking, and in the photographs the difference may be noted.

The bulletins point out the milk used in the United States in the course of one year, if placed where it might be contained would be sufficient to float all the navies of the world.

The bulletin goes on to say:

"Milk is our most perfect food. It contains all of the ingredients necessary to sustain life, and in the most perfect proportions. It is nature's own food. In our early life it is our only food.

"Fat and sugar for energy and fuel, lime and minerals for the bones and teeth, proteins and albumen for sinews and brawn, vitamins for growth and nourishment—this is found in milk. A balance mixed ration in one food, giving, as Rosenau says, the same nourishment as a 'meal made up of meat and eggs, sugar and cereals, oils and fats, with salt and water.'

"Milk is cheap, even though its price may be comparatively high, for in almost every instance more food value is obtained for the money spent in milk than in other foods. The food value of one quart of milk is about equal to eight eggs or three-quarters of a pound of lean beef.

"Milk should form a regular part of our diet, for, used in generous combination with other foods which provide bulk, such as vegetables, bread, meats, and others, it insures that one gets the various food elements needed by the body.

"Drink milk, pure milk, and plenty of it."

—The Canadian Red Cross

SODIUM HYPOCHLORITE IN FOUL-BROOD OF BEES

Several preparations of sodium hypochlorite have been tested during the past season to determine its value in fighting American foul-brood. This disease has been prevalent in Wisconsin apiaries for twenty years or more, and considerable losses have resulted. The work so far conducted by H. F. Wilson seems to demonstrate conclusively that sodium hypochlorite is an effective remedy in destroying spores of the disease provided the treatment is used for a sufficient length of time. The use of the material, however, is limited because the cost of the chemicals is relatively high.

The experiments show that brood combs containing the larvae killed with American foul-brood can be sterilized if soaked in a concentrated solution of sodium hypochlorite for 24 hours and that both of the types of solution so far tested may be used to advantage in sterilizing hive bodies and hive parts from the diseased colony. This may be done by dipping or by spraying with the solution. It was also shown that spores in honey can be destroyed if very concentrated solutions are used. The cost of the chemicals in concentrated solutions, however, is so high as to make their use for this purpose doubtful except where applications can be made by spraying or a very short dipping process.—Bulletin 362, Univ. of Wis.

LEG WEAKNESS OF CHICKS

Leg weakness is generally considered to be caused by improper feeding. The possible errors in feeding are feeding too much, feeding a ration insufficient in mineral matter, or feeding a ration lacking in fiber. Lack of exercise or confining the chicks in the houses is also thought to be a contributory factor in producing the disease. It is unlikely to occur if flocks are fed a properly compounded ration, are not crowded in the brooder house, and are allowed to run out of doors early.

When the disease does occur it may be controlled by making changes in the ration and the method of handling. If the ration is too rich or does not contain enough fiber, it may be corrected by adding wheat bran. As the amount of bran to be added varies with the conditions a general recommendation would be to use equal parts of the mash and bran. Mineral matter may be supplied by sprinkling precipitated calcium phosphate over the surface of the mash after it has been put into the trough or hopper. An abundance of green food should always be provided. If the chicks have been confined in the houses they should be allowed to run outdoors every day that the sun is shining. They should, of course, not be kept out when they show evidence of being chilled, but they can be put out for at least a few minutes each day and the time can be lengthened as the chicks become accustomed to being outdoors.—J. R. Beach.

CHICKEN-POX AND CANKER OR AVIAN DIPHTHERIA

Chicken-pox is manifested by small wart-like growths on the comb, wattles, or skin of the head, and by the formation of masses of cheesy material or canker in the eyes and the mouth. Although these last named lesions are entirely different in character from the lesions on the skin, they are due to the same cause, namely, the virus of chicken-pox. This disease cannot occur unless the chicken-pox virus is present, although unsanitary conditions and poor methods of care and housing make it more likely to occur.

Lesions in the mouth and eyes identical in appearance to canker may be caused by injury to the mucous membrane. Therefore, individual cases of canker may be due to a particle of litter, barley awn, weed seed or similar material becoming lodged in the corner of the eye, the cleft in the roof of the mouth or in the larynx.

Outbreaks of chicken-pox vary greatly in severity. In some flocks but a few birds may be affected and practically no loss result, while in other flocks the lesions may be very severe; it may spread through almost the entire flock and cause a very great loss, both from decreased egg production and from the death of the infected fowls. In outbreaks in which a large percentage of the infected fowls have canker the loss will be greater than in flocks in which the lesions are largely on the skin.

For the treatment and prevention of chicken-pox and canker, vaccination is believed to be most effective. The use of the chicken-pox vaccine has been very extensive in this state for several years past and the results obtained from vaccination have been very satisfactory. One treatment is usually sufficient to check the spread of the disease in slightly infected flocks, although a second treatment is sometimes required. In badly infected flocks a second treatment given seven days after the first is always advised. Vaccine should be used on all birds in the flock as soon as the presence of chicken-pox in the flock is noticed. It is never recommended to vaccinate fowls before the appearance of the disease among them. The reason for this recommendation is that the length of time after vaccination that fowls are protected against the disease is variable and after healthy

flocks are vaccinated there is therefore no assurance that they will be protected longer than three or four months.—J. R. Beach.

ROUP IN POULTRY

The term "roup" is reserved for the epizootic catarrhal condition affecting the mucous membrane of the eyes, nose and paranasal sinuses of domestic birds.

Etiology: The direct etiology of roup continues to remain in doubt. While the filtrable virus of chicken pox can at times be demonstrated in characteristic roup lesions, yet in the large majority of cases which have come to our attention in which roup lesions were not accompanied by external skin lesions, no virus could be demonstrated. Frequently organisms resembling B. bipolaris septicum have been isolated from these cases. We have been as successful in reproducing roup with cultures of these organisms as we have with the virus. Neither one has given uniform positive results. On the other hand infection of the comb with the virus plus scarification produces pox lesions; with bacteria it does not.

Predisposing causes: The predisposing causes are probably of greater importance in controlling the disease than are the direct causes. Careful examination of infected flocks usually reveals one or more of the following conditions present: exposure in cold, damp or draughty places, poor ventilation, unsanitary quarters, overcrowding, and improper or irregular feeding.

Symptoms: The first symptoms of roup are often manifested in the form of colds. It is difficult in most cases to draw a line of distinction between the two. The onset is usually sudden. There is pronounced lacrimation and dyspnea, the nasal discharge at first viscid, soon dries and forms a crust about the nose. The sinuses fail to drain and as a result become filled with viscid and caseous pus. The eyelids close and the conjunctival sac fills with a similar material. Systemic symptoms may develop as in chicken pox. The discharges emit a characteristic foul odor.

Prevention and treatment: These are the same as outlined under chicken pox. In addition surgical interference is necessary on individual birds when the sinuses are badly affected. These conditions resemble typical abscesses and must be dealt with in identical manner. One is often astonished at the immense amount of material found in these sinuses and the extent of the necrosis. To keep the nasal passages and sinuses open, alkaline fluids such as sodium bicarbonate solutions are effective. Ointments containing camphor or menthol with carbolic acid are also popular.

When advising clients in the control of roup, it is often well to inspect the premises carefully. Very often the experienced sanitarian will detect faulty hygienic conditions which have entirely escaped the attention of the attendant.

Also one must remember that when the attack is very severe it is usually more profitable and satisfactory to destroy severely affected fowls than it is to attempt treatment.

Vaccination: The possibility of controlling chicken pox and roup by the use of biologics has received a great deal of attention during the past few years. Two kinds of products have been produced, each of which has had considerable support. One consists of a suspension of ground, dried, attenuated chicken pox scabs. The other is a suspension of various types of killed organisms isolated from roup cases.

Unfortunately the use of either of these products has not given uniformly satisfactory results and they are still in the experimental stage. Veterinarians should be careful in staking their reputation on the results following their use. The argument is often heard that since vaccination is a success in controlling hog cholera, or smallpox, it should also be a success in controlling chickenpox and roup. One might answer that argument by asking the question: Why does not tuberculosis or glanders yield to vaccination?

In experiments conducted at this station where only a portion of each flock were vaccinated, the remainder left as controls, no marked difference has been noted in the incidence or mortality of the vaccinated and non-vaccinated parts of the flock. These experiments are being continued. The co-operation of Missouri practitioners in obtaining accurate data in regard to the efficacy of poultry vaccines is desired. Certain biologies are furnished free for experimental purposes. It is often surprising how willing flock owners are to assist in experimentations of this kind.

Nutritional Roup

Although this is not an infectious disease a brief mention in connection with roup seems appropriate. Nutritional roup is characterized by caseous conjunctivitis, inanition and somnolence. On autopsy the kidneys are pale and the tubules are filled with white urates. Pustules may appear in the esophagus. Foul odor is absent. This condition has been noted in chicks from 6 weeks to 8 months of age in flocks where the diet has been inadequate in greens or other foods rich in vitamine A. Treatment with cod liver oil or butter brings about prompt recovery.—Dept. of Pathology, Missouri Experiment Station.

TREATMENT OF NECROTIC ENTERITIS

What are the best ingredients and formula for making a necrotic enteritis powdered mixture? —W. H.

Reply: The first treatment for necrotic enteritis is to place the animals in good sanitary surroundings, feed easily digestible foods, preferably slop, and give an intestinal antiseptic of which copper sulphate is probably the best and least expensive. From 15 grains to one dram, in the slop according to the size of the animals, is the amount to administer.

ENLARGED CANONS AFTER LYMPHANGITIS IN MARE

I should be obliged for advice on treatment in cases of lymphangitis where the thickening of the leg persists but goes away fairly well upon exercise, only to return after a night's rest. The case is in a Clydesdale mare, seven years old—a very bad attack and very hard to physic. Temperature 104°F. for two days; relapse on fourth day. The leg is not painful at present. How about vaccines?—H. H. H.

Reply: Cases of stocking after lymphangitis such as you describe are rather common and frequently exceedingly persistent. The line of treatment that gives best results is bandaging. That is, after exercise, put a snug bandage on the leg and keep it there until the horse is exercised or worked again, and afterwards bandage again. Such treatment results in a permanent cure in the course of sixty to ninety days in a fair percentage of the cases.

SUBSTITUTE FOR GINGER

I have been using as a stock colic medicine the following, but the ginger does not go into solution, thus it has to be shaken each time. I could use tincture of ginger, but the cost is too high. Is there anything that will dissolve it that is reasonable in price? The formula is:

℞

Tinc. aconite ..... ℥i
Powd. ginger ..... ℥iv
Sat. solution sod. hyposulphite.... Oi
M. ft. sol.
Sig. Give 2 ounces every hour.

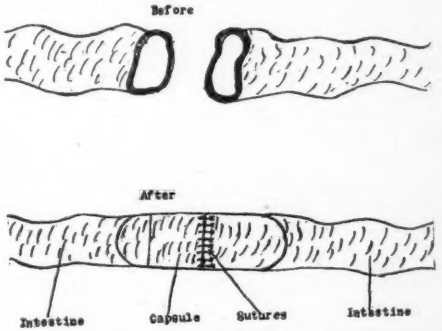
—A. H. W.

Reply: If you will substitute for the powdered ginger in this prescription, two drams of fluid extract of capsicum, you will get about the same effect, and you will hold the cost much under that of an equivalent amount of tincture of ginger.

INTESTINAL ANASTOMOSIS IN PIGS

As I have enjoyed the helpful hints in Veterinary Medicine for the past eleven years and have not contributed for the benefit of others, I include herewith a pen sketch of my procedure in intestinal anastomosis in the pig. I have never seen this very simple method described in veterinary literature. If my brother practititioners have not thought of this method of uniting the intestines in those cases where they are called to fix a pig that has about three feet of the intestines dragging on the ground and torn into shreds, following a rough job of castration, all I ask of them is to try this method and see how simple it is to handle these cases.

I am quite sure most practitioners have had such cases to deal with. I have had them in different sized hogs. If the animal is small, I hang it up by the hind feet; if large ones, I



stretch them out on the ground. I make an opening directly over the inguinal ring, pull the intestine out until healthy tissue is found, cut the intestine at this point and discard from two to four feet or all of that portion which has been strangulated. Then I insert a one-ounce capsule into the intestine and sew the two ends together over the capsule, which is as easy as the way grandmother used to darn socks with a gourd inside, only I leave the gourd (capsule) in the intestine, place same into the abdominal cavity, stitch the opening in the abdominal wall and turn the pig loose, allowing only soft feed for a few days.

There is very little after treatment, and one has rendered good service instead of using the ax on the patient. Of course, it is needless to state that silk or good catgut suturing material should be used. I most always use catgut.

J. F. Callison, D. V. M.

Moweaqua, Ill.

SKIN AFFECTION IN CATTLE

I have under supervision a herd of Guernsey cattle that have come through the winter in pretty poor condition and have an intense itching continuously. There are ten animals in this herd, and they have to be kept in the stanchions because of the way they lick and bite themselves when they get out into the yard. The owner told me that these animals were badly infected with lice during the winter, but I have been unable to find any on them now, although the parasites have left their marks in causing the hair to come out on different parts of the body.

There is no eruption of the skin. There are spots covered with scabs where the animals have gotten at their skin while in the barnyard. We clipped this herd of cattle and washed them with soap and water and are now applying a sulphur, tar and oil mixture to the skin, potassium bitartrate, etc., internally.

I have examined the scrapings microscopically with negative results. The skin does not look mangy or broken out, although there are considerable loose epithelial scales. The animals dig themselves until the blood runs if we let them out in the yard.

The herd has been salted regularly. The feed has been dairy grains and ensilage. About two weeks ago the ensilage gave out, and the owner is now feeding hay and dairy grains.

—A. L. S.

Reply: The case you describe reads strikingly like mange in cattle, both as to symptoms and history; but if the scrapings were carefully taken and the microscopic examination competently made, it would appear to exclude that condition, which puts us in the dark. It might be mentioned that in chronic cases of scabies the parasite is often deeply entrenched and may not be found in surface scrapings.

If mange is excluded, one would think first of a condition more common in the Southwest than in your section, referred to by the farmers as "mad itch." It is now generally thought to be a type of hemorrhagic septicemia, though some cases appear to be simply forage poisoning, a rather rare occurrence in cattle if we differentiate between forage poisoning and plant poisoning. Still others think that some cases described as mad itch may be botulism, although there is a doubt if cattle are susceptible to botulism as a natural infection.

This line of investigation would lead us to look into the feed that the cattle are receiving and make sure that none of it is spoiled or moldy. Again animals heavily fed on cottonseed hulls or cottonseed meal develop a variety of ailments, including involvement of the skin. Animals that are all white or have white spots on their skin, occasionally suffer from an eruption after eating buckwheat or St. John's Wort and perhaps after eating alsike and red clover, potato skins and some other foods. The condition is termed fagopyrism or trifoliosis.

The line of treatment you are following cannot harm your cattle and would appear to offer fair prospects of helping them. In addition to correcting anything that may be wrong in the feed, a lime and sulphur dip is suggested if the results from the oil and tar are not satisfactory.

DEPRAVED APPETITE IN PUPPIES

I have encountered a condition in a litter of Police puppies that puzzles me somewhat. There are nine pups and they are ten weeks old. They have been fed well on Perfection food, with meat, skim milk and puppy biscuits in generous amounts. They are in good condition and above the average as to weight. My yard is covered with cinders and bordered with flower beds. These pups will eat the cinders with great relish and will swallow quite large pieces. This seems to give rise to a gastro-intestinal irritation which destroys the appetite temporarily. I have had them excluded from the yard for a week now and have been feeding vegetables such as cabbage, carrots and turnips, also cod liver oil. They have been given elixir glycerophosphate with calcium and sodium and liquor ferris in average doses. They have had also 50 capsules of metagen. I was under the impression that they needed some mineral and that the foregoing would supply it. On letting them into the yard, they went for the cinders as before. They will lick iron and chew on nails or any metallic object, also soil, etc. They have good appetites except after being in the yard where cinders are available. Could you help me out with suggestions as to treatment of these puppies as they are my own and are good stock?—H. H. H.

Reply: Aberration of the appetite such as you describe in the Police puppies is almost always due to dietary errors and ordinarily is overcome when the errors are corrected. The feed that you have been giving seems, however, so complete in essential requirements that it is difficult to suggest an improvement, unless, as I rather fear is the case, you have given the pups only cooked meat. There is something about raw meat that makes it essential for growing dogs, and they don't do their best if deprived of it.

Furthermore, especially when the eruption of teeth is active, dogs like and need hard substances to chew and should be fed bones. Large bones, of course, are safer than small ones, but with dogs there is almost no danger from eating bones, except only fowl bones. The compact portion of fowl bones is so very hard that they are sometimes unaffected by the digestive fluids and the sharp ends of splintered bones wound and even penetrate the intestinal wall and set up disturbances that are occasionally fatal. The softer bones of mammals are eaten by dogs safely and gnawing them is greatly enjoyed. The presence of tape worms or other intestinal parasites is to be thought of and we presume has been excluded by you.

The Army Meat and Dairy Hygiene Service

By Capt. Geo. H. Koon

The veterinary service is charged with responsibility for the selection, grading, and inspection of meat-producing animals purchased for the army before and after slaughter, and of dressed carcasses and of meats and meat food and dairy products before purchase or before delivery to organizations, including the sanitary supervision of the source of products, of the construction and condition of establishments, storage places, and carriers by rail or water wherein such products are manufactured, processed, stored, transported, or otherwise handled, and of all methods, processes, or other procedures adopted in the maintenance and operation of the foregoing agencies of production, and for the inspection of dairies and milk herds supplying milk to the army.

Meat and dairy hygiene, as an integral part of the veterinary service, has to do with the maintenance and operation of the various classes of inspection procedures designed to detect insanitary conditions of meats, meat food, and dairy products and of dairies, and with the making of appropriate recommendation in connection therewith for the purpose of protecting the health of the troops and the interests of the government.

The veterinary meat and dairy hygiene service is essentially sanitary in its nature. Its purpose is to protect the health of the troops by preventing the purchase or issue of meat and dairy products which by reason of their source, nature, handling, or condition may be unsafe or unsuitable for food purposes. As a sanitary procedure it is an extension of the sanitary service maintained by the Medical Department. The supervision thereof exercised by the surgeon of a station or command should be such as will best serve to co-ordinate the technical duties performed by veterinary personnel with the other general requirements of the sanitary service in order that the whole may function most effectively without duplication of effort or lost motion in attaining the main objective of protecting the health.

In so far as this service deals with the purchase, receipt, and issue of designated food supplies by purchasing and issuing officers, it is closely involved with the responsibility of such officers that such supplies as they may handle shall comply with the specifications under which they are purchased, received, or issued. Purchasing and issuing officers are necessarily dependent for expert advice on veterinary personnel making inspections, and full co-operation by such personnel is enjoined with a view to adequately protecting the financial interests of the government.

The defects to be looked for, both sanitary and in specification requirements, are usually detected in the same veterinary inspection. No inspection for specification requirements is contemplated which does not include simultaneously an investigation of sanitary conditions, and the two inspections overlap and blend in essential features. Nevertheless, sanitary inspections are more comprehensive and must be applied repeatedly to the same products in order to insure the continuance of the conditions found to be correct when the supplies were originally procured. Sanitary inspections of supplies are therefore required while they are in storage or when they are shipped, issued, or sold, when the question of specification requirements is not under consideration; and the same is true of sanitary inspections required to be made of establishments and dairies as hereinafter described.

The federal meat inspection act provides for the inspection of meats intended for interstate shipment by the Department of Agriculture, and the larger part of such supplies purchased

for the army is inspected and passed by this agency in so far as concerns ante and post mortem examinations, and, at times, other inspection procedures. It is the function of the veterinary service not to duplicate this work, but as an army agency to take over the inspection of supplies purchased or offered for purchase, accepting the findings of the Department of Agriculture so far as they go and completing for the army the inspection to the point of issue to troops. With reference to food supplies not intended for interstate shipment, such as are slaughtered and sold within a state or outside the territorial United States or in the field and in other places where the federal meat inspection act is non-applicable, the fitness of such supplies may depend entirely on the inspection of the army veterinary service, unless a competent state or municipal inspection is maintained. The veterinary service, therefore, in its duty of protecting solely the interests of the army, continues the inspection procedures of authorized federal, state, or municipal agencies, accepting those deemed competent, supplementing them where they are incomplete or entirely absent, and repeating them only when they are manifestly inadequate or incompetent.

Information concerning the condition of food supplies is obtained through veterinary inspections of various kinds. The inspections pertaining to meat and dairy hygiene are the following: Inspection of food supplies; inspection of establishments; dairy inspections. Inspection of food supplies is further subdivided as to locality into four classes; inspection prior to purchase; inspection at receipt; inspection in storage; inspection at issue to troops. The extent of these various classes of inspections and the nature of the procedures involved are described in the following paragraphs:

The veterinary inspection of food supplies consists in the examination of all foods of animal origin, beginning at the source of origin or the first point of contact with the military service and ending with their issue to troops. The food supplies embraced in this category are live food animals, beef, veal, pork, mutton, goat meat, rabbits, poultry, game, and other meats, fish, oysters, and other sea foods, eggs and milk; whether fresh, frozen, cured, canned or otherwise processed or prepared in any way, including all food supplies of which they form an essential part, and all products, preparations or parts derived therefrom; rendered or prepared fats of animal origin as lards, lard substitutes or compound, oleomargarine, butter and cheese. The terms "supplies" or "food supplies" as used in these relations will be understood to apply to the supplies, products, etc., enumerated and described in this paragraph.

The inspection prior to purchase is the inspection made during manufacture or when the supplies are offered for sale to the government at purchasing points, at stations or in the field.

The inspection on receipt is the inspection made when and where the supplies are acquired or accepted, either at purchase by a purchasing officer or by the troops directly, or by shipment from a supply officer to a storage or issue point and is maintained at purchasing points, at stations or in the field.

By the term inspection in storage is meant the inspection of food supplies subsequent to their procurement or acceptance and prior to their issue or prior to shipment from one station to another. These supplies by reason of their tendency to undergo deterioration and harmful exchanges, rendering them in part or in whole unfit for food purposes, should be examined at intervals from the time of their receipt at a storage place. All such inspections are of the nature of reinspections of the extent and thoroughness required by existing conditions. Inspection in storage is practically limited to the service at supply depots and at stations.

The inspection of surplus stores the sale of which to the public is contemplated, is a special procedure. The supplies may require interstate shipment and the rules of the Department of Agriculture applicable to civilian shippers and dealers in like cases must be complied with in all respects.

The inspection at issue to troops is the final veterinary inspection given food supplies at or shortly before their issue, is essentially for soundness, and pertains entirely to the service of stations and in the field. It is similar to the inspection in storage, but is more detailed and takes into consideration the fact that the supplies have reached the point of ultimate disposal. So far as practicable, it is a piece inspection.

The veterinary inspection procedures applied to food supplies are considered under three headings, i. e., ante-mortem inspection, post-mortem inspection, and products inspection, which are defined and described in the appropriate pamphlets of Army Regulations. Each one of the four classes of inspections defined involves some part of one or more of these procedures, depending on the progress made by the food supply in question from its source to its final disposal by issue to the troops.